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PORT OF ASHTABULA.

Wonderful transformations have been the order at Ashtabula for the past thirty-five years, but the greatest and most marvelous of all is the one

which is occurring now. From an ordinary lake port which has had a difficult time to maintain her supremacy, she is to take one long jump in the

next two years and become beyond question the greatest ore-receiving port on the great lakes and in the world. When the Lake Shore and

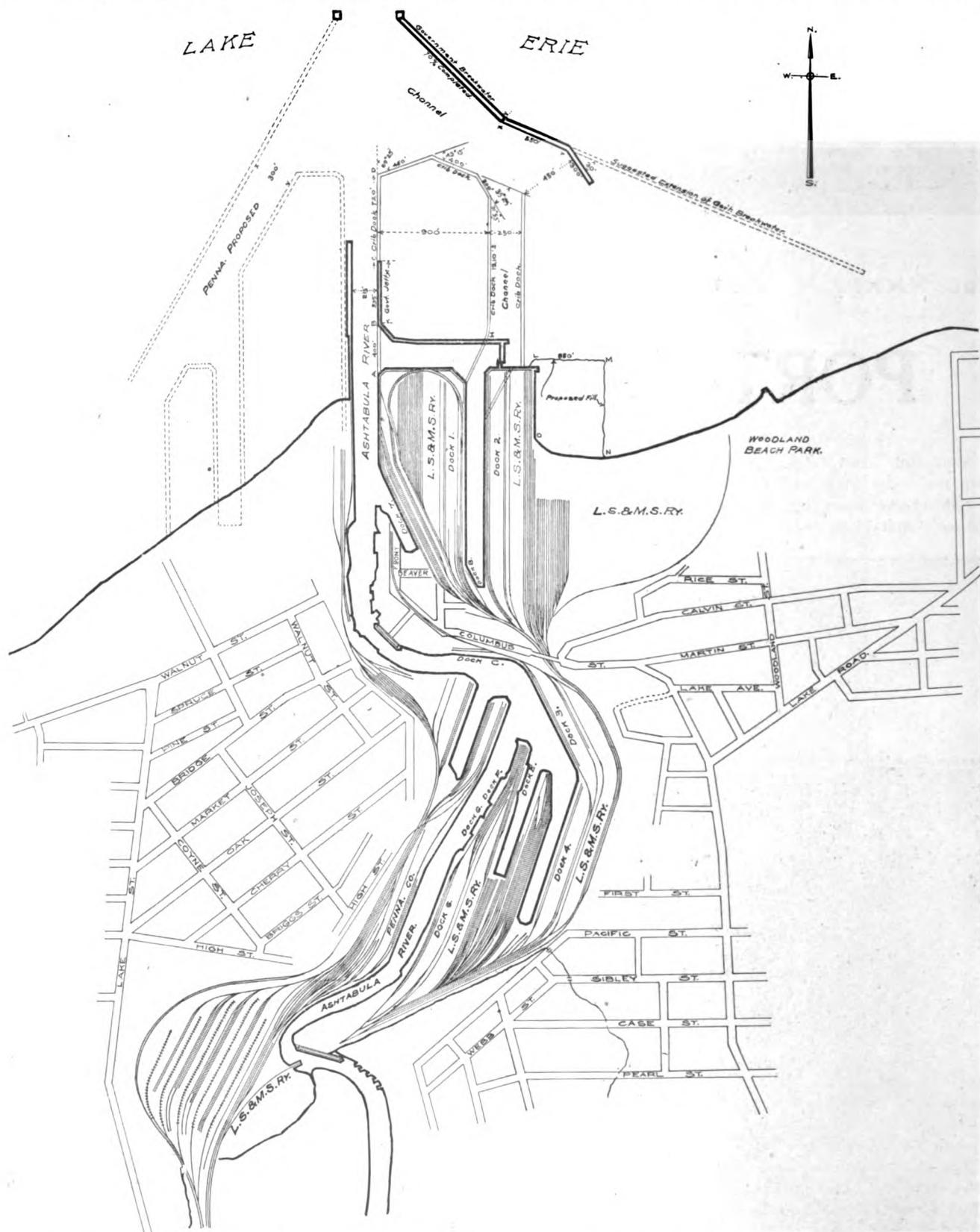


SHOWING THE WIDENING OF THE RIVER AND THE NEW CONCRETE PIER WITH THE OLD RANGE LIGHT OUT 60 FT. IN THE RIVER.

Pennsylvania systems' lake front improvements are completed, there will be no further question about her su-

the south shore of Lake Erie, but that was so many years ago there is no one alive now who remembers it.

through a channel dredged through the bar at the mouth of the river in 1802, and they let it go at that. They



MAP OF ASHTABULA HARBOR SHOWING GENERAL LOCATION OF LAKE SHORE RAIL WAY IMPROVEMENTS.

premacy. In fact, she will be in a class by herself.

The time was when Ashtabula was nothing more than an indentation on

The present inhabitants do not live in the past, anyway. They have a vague understanding of the first boat load of merchandise being hauled

now look for new and greater things.

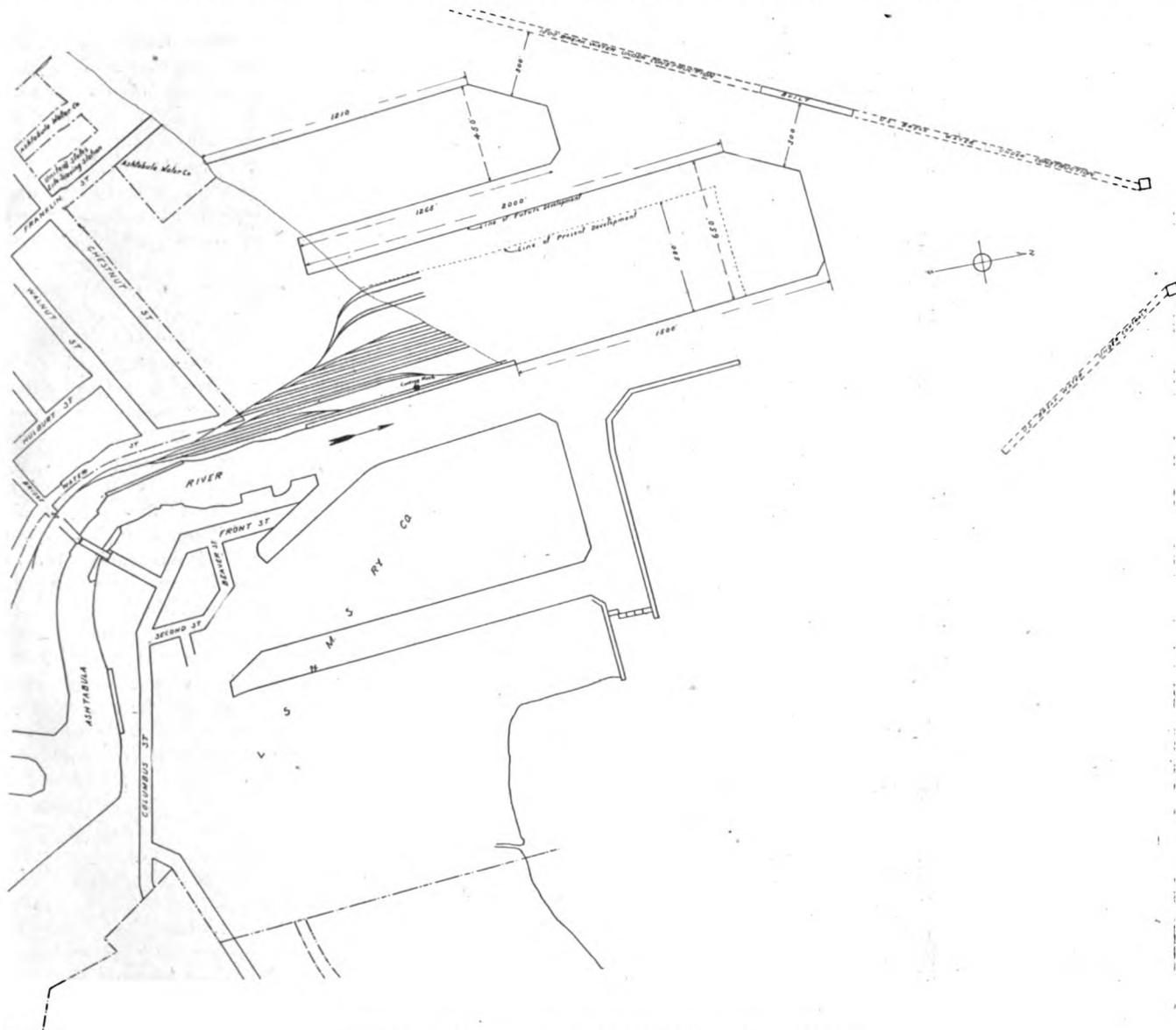
That every loyal Ashtabulaite has a right to do this is certain because the railroads which enter the port and

control its traffic have set aside millions for the improvement of their shipping facilities. They know that the whole lake freight movement is too great to be comprehended and they realize that the tremendous increase in lake tonnage means but one thing—a corresponding increase in dock space. For this reason, therefore, they will expend at least \$7,000,-

sible to rival the records made by the Hulett machines now in operation at Conneaut. Roughly speaking, the new area for storage and yards will run over eighty acres.

Doubling the capacity of a port like Ashtabula means a great deal when it is remembered that she received about 6,500,000 tons of ore over the old docks during 1905. The total lake

not be overlooked. The docks will be so arranged that the largest boats can go to the lake front, while the medium-sized and small freighters can trade above the bridge to the docks which have always given such good service heretofore. Such important items will result in taking tonnage from every other port on Lake Erie. With a short haul to the east, there is



GENERAL DIAGRAM OF PENNSYLVANIA IMPROVEMENTS.

000 in improvements. Both companies propose to keep abreast of the times and to ride on the crest of the country's prosperity.

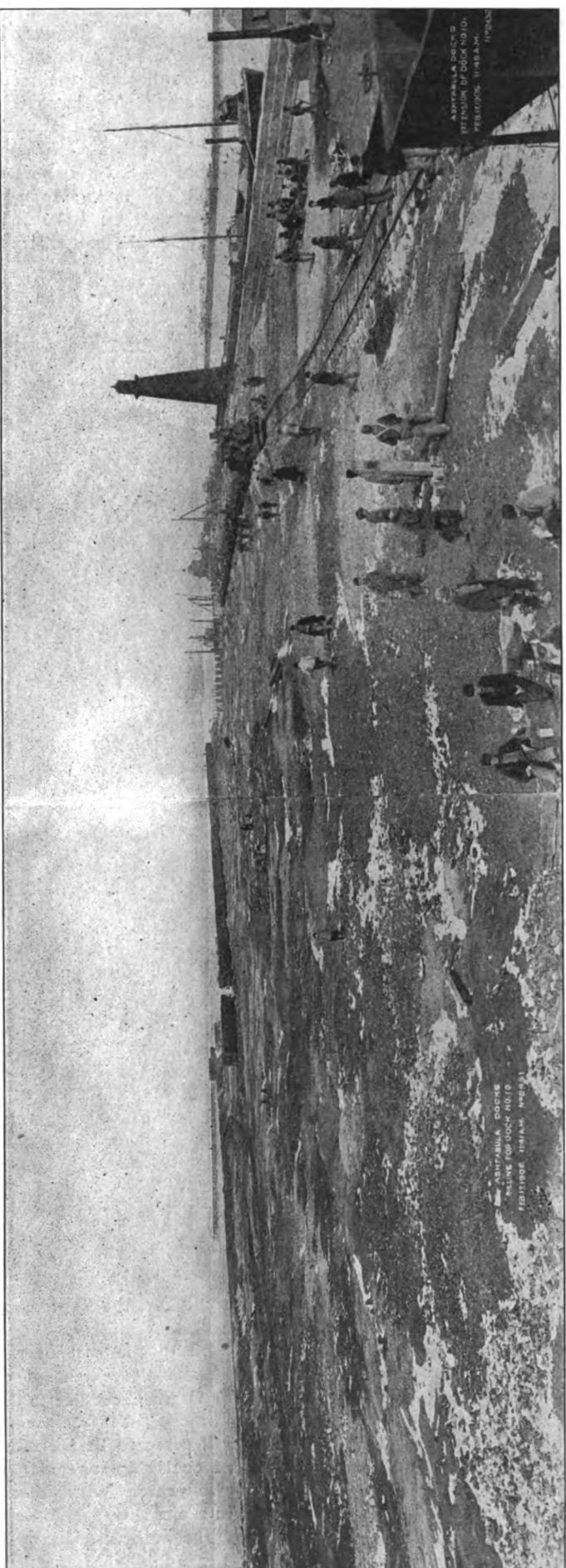
The plans outlined and already being carried out call for increased dock space which will easily double the capacity of Ashtabula's harbor. There will be miles of docks and the longest freighter now sailing the lakes will be able to come in and unload or load her cargo. No cargo will be too large for the new docks and the improved machinery will make it pos-

movement will not run much over 40,000,000 tons in the next two years, so that Ashtabula will be in shape to handle nearly 15,000,000 tons of ore if the dispatch is good enough at both ends to allow for it. A little over 2,000,000 tons of coal were shipped in 1905, and the coal-loading facilities are extensive enough now to double this for bituminous coal, alone.

But aside from the great volume of traffic, which the new improvements will attract to the port, there is another important feature which must

another argument for the supremacy of the port.

The short haul to the east over a low-grade road and the extension of the Lake Shore's Beach Creek line to the Clearfield anthracite district means that Buffalo will cease to be the most important hard coal shipping port on the lakes in two years. With Ashtabula already in a class by herself as a soft coal port, the anthracite business will make her doubly important. Boats which can be loaded with hard coal at Ashtabula will be sent there



FILLING IN FOR DOCK NO. 10 PENNSYLVANIA SIDE, ASHTABULA HARBOR, AS IT APPEARED ON FEB. 17, 1906.

in preference to Buffalo in nine cases out of ten.

All the foregoing changes are to be accomplished facts and not idle dreams, because the plans are broad enough to admit of extraordinary enlargement by the time the present work is completed. The government breakwater will eventually extend from the outer entrance to the east and west shores, which means that additional docks can be constructed as the increase in business demands it. And in view of the fact that owners and shippers are hanging to the 10,000-ton freighters, it seems certain that another decade will see all the boats handled on the lake front.

The Lake Shore is now constructing under the immediate supervision of Mr. Edgar C. Bowen, assistant engineer, a 4,450-ft. stretch of dock and fill extending the present space on which the Pickands, Mather & Co. coal dump and Hoover & Mason clams and the Carnegie Steel Co.'s Browns and Hoover & Mason clams are located. The Pennsylvania, under the supervision of Mr. John P. Fitzgerald, engineer in charge, has already constructed a 1,125-ft. concrete pier, extending from the present M. A. Hanna coal dump along the main river, but the Pennsylvania is to have two 1,200-ft. and one 2,000-ft. docks in addition to this.

The work now being done by the Lake Shore was started June 1, 1906. The present east-and-west slip, used to get into the old Minnesota slip, will be abandoned and filled in when the outer lake area is filled. This will make a clear 900-ft. space between docks which will be 1,655 feet long at the furthest point. Boats will get into the Minnesota slip from the outer harbor then. In order to do this, thirty-seven 200-ft. cribs were used and 125,000 cu. yds. of sand and 250,000 cu. yds. of rock were excavated. To fill the enclosure made by the cribs will require 1,500,000 cu. yds.

The Pennsylvania's work was started April 1, 1905. It was begun back of the shore line continuing the line of the M. A. Hanna coal dump dock. There are 1,120 ft. of concrete pier in the main channel and a fill 650 ft. wide has been made with stone jetty work on the west side of the fill 2,000 ft. long. In addition to this, there is a tremendous yard area on the shore which the railroad owns. The yards will probably extend up beyond the life-saving station, if the latter is removed to the main river, as seems likely.

Ashtabula's future as an ore, hard and soft coal port is unquestioned, but there is another trade which has not

whatever other heavy commodities are sent across to the Dominion. She will carry 15,000 tons each trip and

are well posted men in Ashtabula who confidently predict greater changes than have been enumerated in this

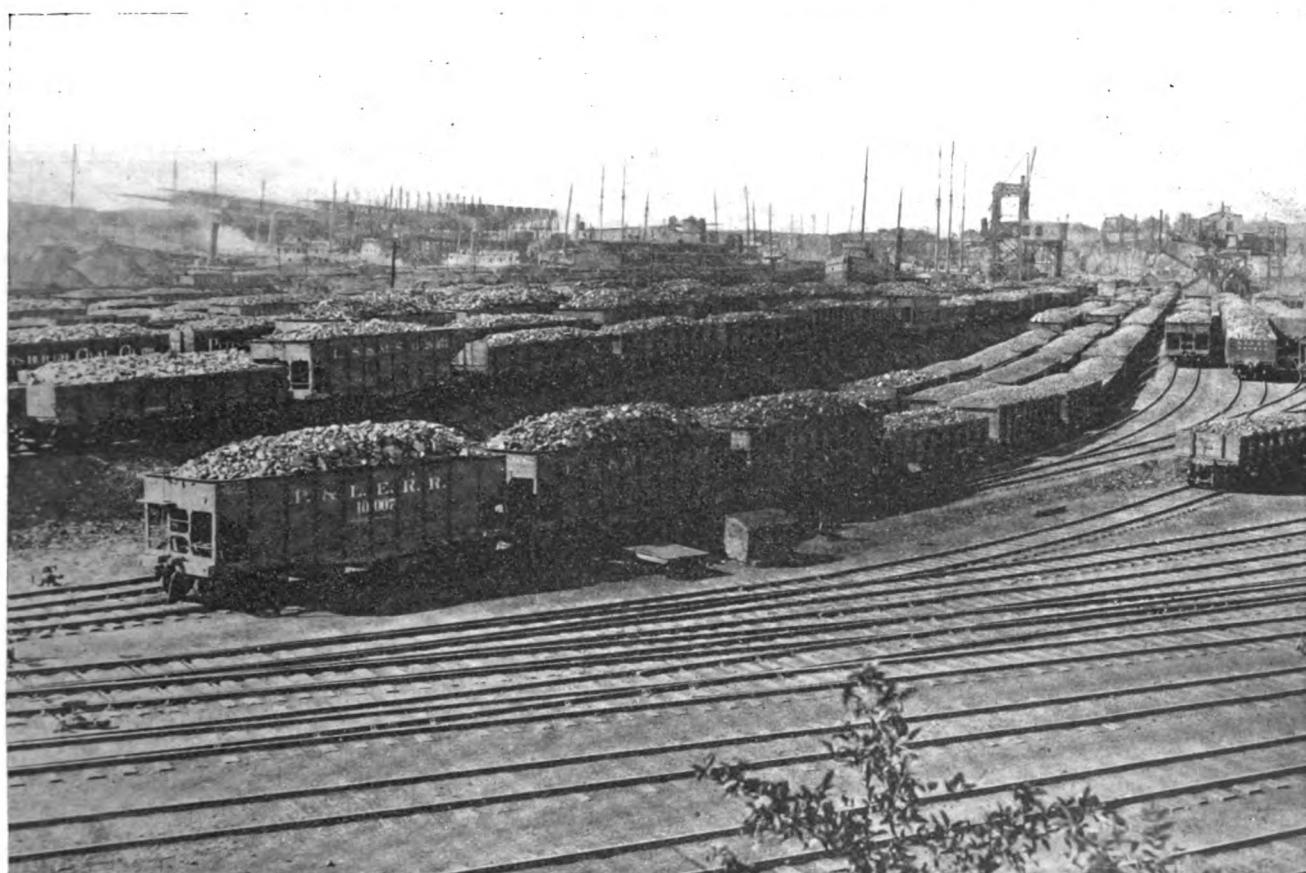


ENTRANCE TO ASHTABULA HARBOR IN 1906, SHOWING THE CARFERRY ASHTABULA IN THE FOREGROUND.

been mentioned. May 12, 1906, the new Pennsylvania & Ontario carferry

she has recently been put on a three-trip-a-week schedule. The Ashtabula

article. They assert that the port will become prominent as a grain-receiving



LAKE SHORE YARDS ABOVE UNION SLIP SHOWING COAL AND ORE DOCKS AND BOATS IN HARBOR.

Ashtabula was put in operation between Ashtabula and Port Burwell to transport hard and soft coal and

is an ice-crusher and will, therefore, run during the winter months.

One thing leads to another. There

ing outlet to the east on account of the shorter distance to New York and other eastern shipping points.

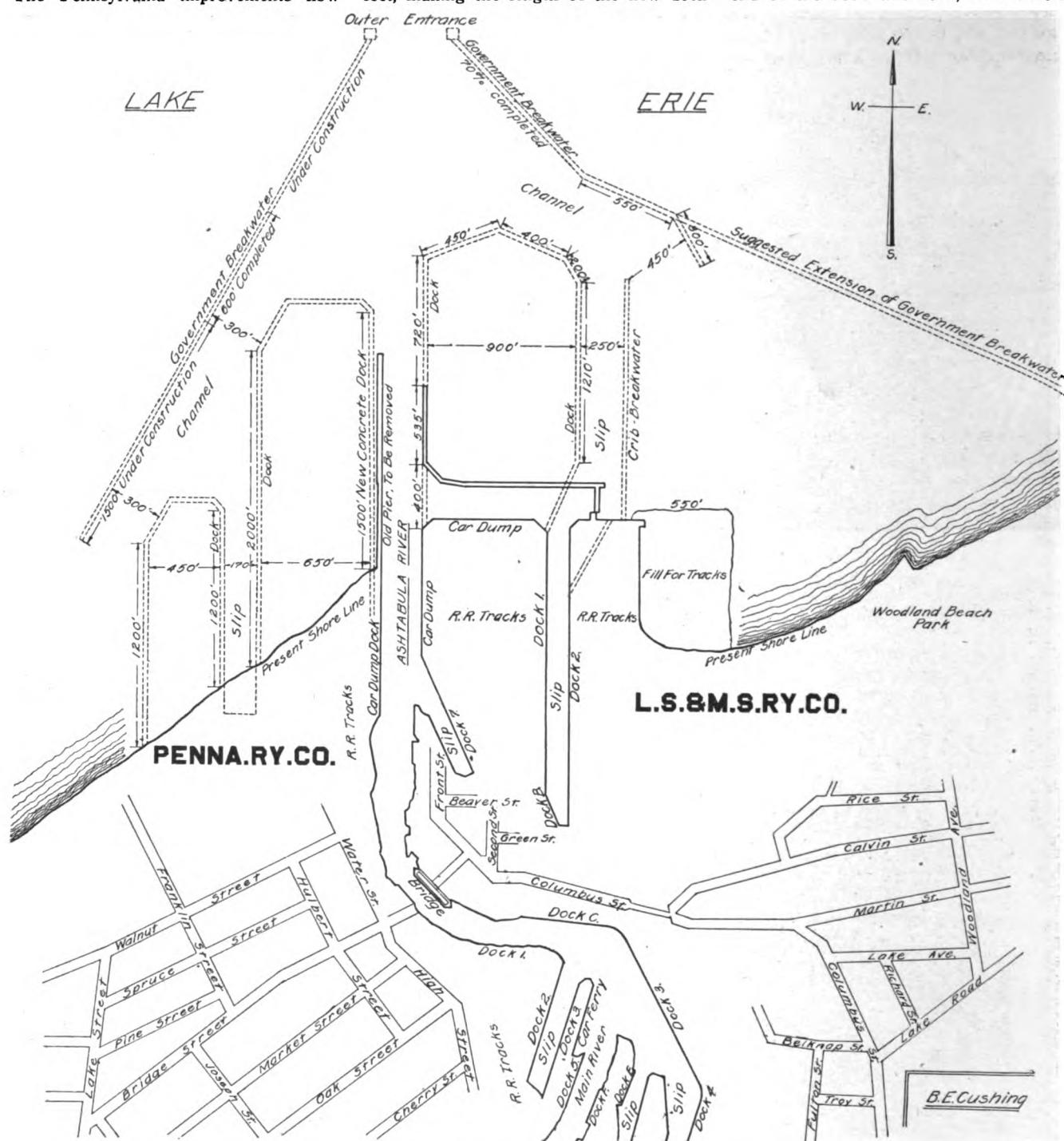
The Pittsburg & Lake Erie canal's northern terminal will be Ashtabula.

PENNSYLVANIA IMPROVEMENTS.

The Pennsylvania improvements now

ing machine almost due north toward the harbor entrance 1,100 feet, although the plans contemplate future extensions of 400 feet, making the length of the new dock

650 feet, so that when the undertaking is completed the receiving dock will be 1,500 feet long and 650 feet wide. The outer end of the dock will be 1,800 feet from



PLAN OF THE PENNSYLVANIA AND LAKE SHORE RAILROAD TERMINAL FACILITIES IMPROVEMENTS AT ASHTABULA HARBOR.

The heavy continuous lines on the above map show the present shore line, piers and river bank; the dotted lines indicate the position of the proposed breakwater and dock frontage. It will be seen that an entire new lake front harbor is to be the outcome of the operations now in progress, the Lake Shore company doing the work on the east side of the river and the Pennsylvania doing it on the west side. The Lake Shore work embraces the completion of the portion of the east government breakwater already partially built and the construction of 850 ft. of additional breakwater. Cribbing will be built across the mouth of the present lake-front slip which is now entered from the west, and other cribbing will go in from the extreme outer end of the present east pier 720 ft. into the lake, thence east and back to the shore, enclosing a space of 900 ft. in width which will require 1,500,000 cubic yards of earth to fill, while 100,000 tons of stone will be needed for the cribbing. A crib-breakwater will be constructed on the east of the reclaimed section just described and will serve to protect a new slip, 250 feet wide, leading from the lake and giving a new entrance to the present lake front slip, the mouth of which is to be closed by cribbing. All channels and slips adjacent to the new work will be dredged to a depth of 21 feet and will necessitate in places a cut of ten feet into the solid rock.

On the Pennsylvania side 3,300 ft. of breakwater is under construction and two huge sections of beach are being reclaimed, enclosing between them a new slip 470 ft. wide. The fill nearest the river is 1,500 ft. in length on the east side and 2,000 ft. on the west side. It has a width of 650 ft. The smaller fill to the west extends outward 1,200 ft. into the lake and is 450 ft. wide. Upon the completion of the Pennsylvania work and the construction of a new concrete dock 1,500 ft. in length on the west bank of the river, the present west pier will be removed, a change which will widen the river channel by 60 ft.

under way are on the west side of the river and will extend from a point 500 feet north of the old McMyler coal load-

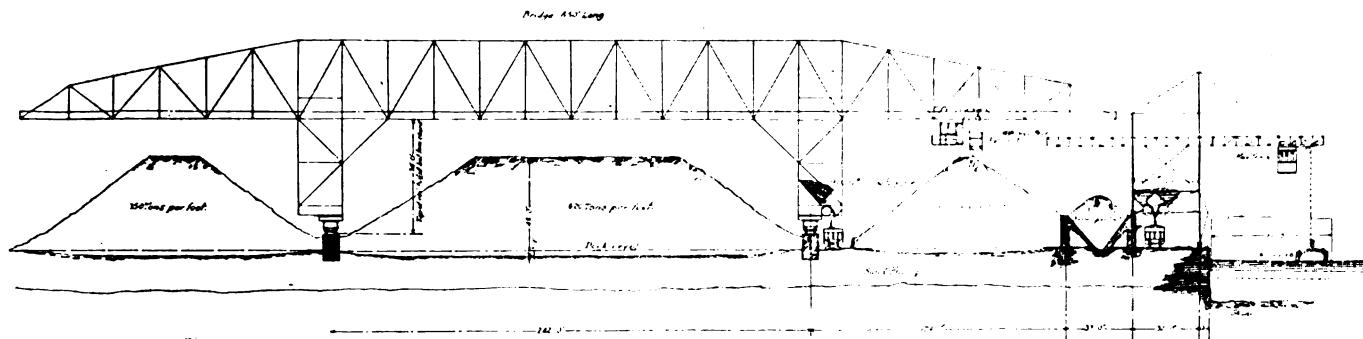
1,500 feet. Present plans call for a width of the improvement of 520 feet and provision has been made to increase this to

the breakwater entrance and the range light on the present west dock will be moved to the outer end of the new dock

and 60 feet to the westward, this being made necessary by the widening of the river that distance along the face of the new improvement. The channel, now 200 feet, will be 260 feet, ample for the accommodation of the larger boats and

Several entirely new features will be installed in these unloading machines and on the bridges, chief among them being the scale hopper pockets which will make it possible to weigh the ore before it is dropped into cars, enabling quicker

so arranged that the operator can readily twist the grab crosswise of the hatch at right angles to the line of travel of the trolley. The motors will be of sufficient capacity to make round trips with maximum loads in 50 seconds from ore di-



DISTRIBUTING AND HANDLING BRIDGE, PENNSYLVANIA DOCK IN ASHTABULA HARBOR.

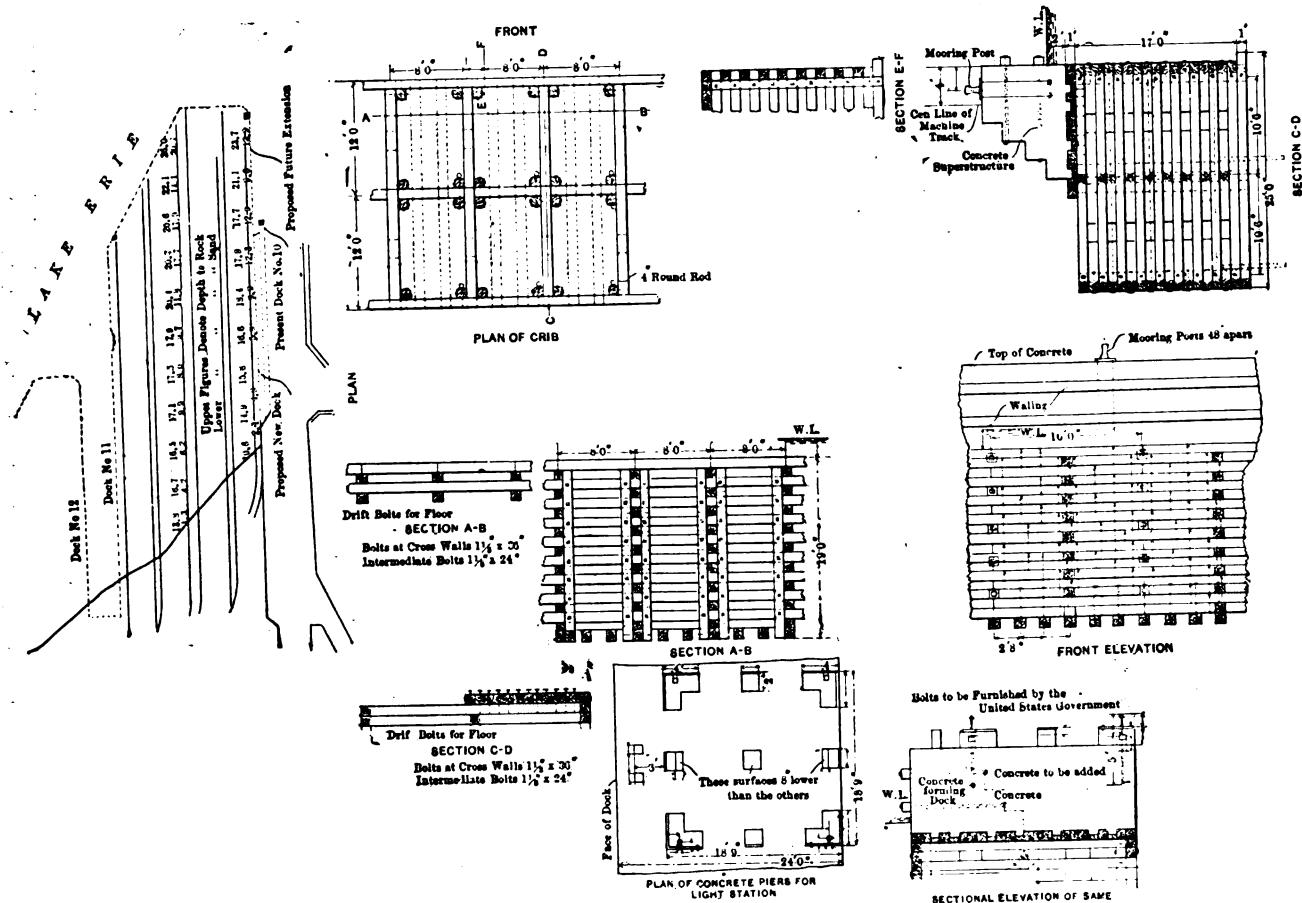
the increased traffic that will be handled. The dock will be constructed with a crib foundation 18 feet deep, surmounted by a concrete top, the concrete beginning about 3 feet below the water line. The

handling of trains, the loading being accomplished without detaching the cars from trains in order to weigh.

The unloaders will be electrically operated, 220-volt direct-current, each of

rectly underneath the hatch of the vessel being unloaded.

The runways of the unloaders will be of sufficient length to reach the outside of a vessel 65 feet wide and to discharge



DETAIL OF PENNSYLVANIA CO'S CRIB WORK.

unloading machinery will consist of six Hoover & Mason unloaders and one distributing and handling bridge. The length of the bridge will be 550 feet with a 250-foot center span and two 150-foot cantilever spans.

the six machines operating one of the Hoover & Mason latest six-ton wide-opening grabs. The motors actuating the unloaders, both for hoisting and traversing will be in the trolley and travel with the trolley. The trolley will be

into the concrete trough at the rear of the unloader, as shown in the accompanying sketch. Upon each unloader will be placed a scale hopper, resting upon scales of 180,000 pounds capacity. This scale hopper will have two discharge

rollers which will load cars upon one track beneath the hopper. An indicating dial will be provided which at all times indicates the amount of ore in the hopper, thus making it possible at all times to know to a nicety the exact amount dropped through the rollers into the car beneath. To load a car the rollers are actuated a sufficient length of time to discharge ore to the maximum capacity of the car, as indicated on the dial, at the same time enabling the cars to be loaded in train form without being disconnected. Mechanism for raising the boom and moving the machine along the dock will also be provided.

The bridge, as has already been mentioned, will be 550 feet long, and as shown in the accompanying sketch, will rest upon turntables, which permits either end to travel independently in order to better cover the storage piles. In the tower next to the dock will be placed a scale hopper, similar to those on the unloaders, and resting upon scales of 180,000 pounds capacity. The dial and method of operation will be the same as those on the unloaders. The grab on the ore bridge will be of the latest type, of 14 gross tons capacity, and the hoisting and traverse motors will be in the trolley and travel with the operator. Westinghouse air brakes will be used to control the traverse motion and air brakes and also air governors are provided to control the descent of the grab. Westinghouse friction draft gears are provided at the end of the bridge to prevent accident. The hoisting speed of the grab will be 140 feet per minute and the traversing speed of the trolley will be from 800 to 1,000 feet per minute. The bridge traverse speed will be about 60 feet per minute. The bridge will be electrically operated, 220 volts direct-current.

LAKE SHORE RAILWAY IMPROVEMENTS.

On the east side of the river the Lake Shore & Michigan Southern is rushing work on dock extensions which will greatly increase its facilities for handling both ore and coal. The improvements are on an elaborate scale, involving the expenditure of something like \$2,000,000, and, despite the energy with which the work is being pushed, will not be completed in their entirety before the close of 1908. Through the delay of governmental authorities in approving the plans as originally prepared, the Lake Shore lost considerable time in starting, though this handicap has already been largely overcome.

Briefly stated, the improvements consist of the extension of the present lake front dock about 1,600 feet further out into the lake, the new



ASHTABULA HARBOR IN 1906.

Looking from right to left are the buildings in the harbor business district, P. Y. & A. slip, Pennsylvania & Ontario carferry slip. The old river bed is at left side with the Mahoning & Shenango dock on south and the Hanna portables on the opposite side.

section according to plans having a uniform width of 900 feet. The west side of these docks will front on the Ashtabula river, and the east side upon a new slip to be about 250 feet wide. The river front will be equipped with coal handling machinery and will be given over exclusively to coal traffic. The river front as it now exists will be kept intact; as an extension

moved to give clear passage into the present slip reaching dock B. A large fill is to be made into the lake just east of dock 2 to provide room for a system of track loops, similar to that now in operation on the present docks where the gravity system is extensively employed for the handling of cars.

A crib breakwater is to be con-

structed by the Edward Gillen Dock, Dredge & Construction Co. The dredging work, involving the removal of some 200,000 cubic yards of sand and rock, is in the hands of the Standard Contracting Co., Cleveland. The crib dock work, including the building of about 4,500 lineal feet of ordinary crib construction, is being done by the railroad company's



VIEW OF MINNESOTA SLIP AND LOWER LAKE SHORE YARDS FROM COLUMBUS STREET BRIDGE.

the canal between the end of the present docks and the government jetty will be built in, a distance of about 400 feet, the jetty wall will be made use of as a part of the new river frontage and a new section 720 feet in length will be added at the end. Additional room in the river is provided for in the plans of the Pennsylvania company, which is to remove the old government pier and set its new dock front back from 50 to 60 feet.

The ore handling plants of the Lake Shore will be on the east side of its docks, fronting on the newly constructed slip. A roomy channel will be provided along this side, a considerable section of the government jetty will be torn away at the lower end of the channel, and an out-jutting corner of dock 2 will be re-

structed along the east side of the new slip. The entire improvement will be under the protection of a government breakwater almost 2,000 feet in length on the Lake Shore side. A section slightly more than half this length, adjacent to the mouth of the harbor, is being built by the government. Work on it was 70 per cent completed in May, but since that date it has been tied up in the courts most of the time by troubles of the contractor and little progress has been made. An elbow section 850 feet in length is being constructed by the railroad as an extension to the south-east end of the government project. Work on this has been rushed and it is now practically up with that on the government section, begun months earlier.

The breakwater extension is being

forces. About 1,000,000 cubic yards of filling will be required.

The cribs enclosing the dock structure will be completed by the close of this year, the long crib dock on the east side of the new channel will be built in 1907 and it is expected that the entire work will be finished by the end of 1908. The Lake Shore docks will then extend about 3,000 feet out into the lake beyond the original shore line. The additional facilities provided will at least double their present capacity. They will avoid the necessity of working freighters up through the winding channel of the river and particularly around the sharp bend which now prevents the entrance of the largest craft. The special type of ore and coal handling machinery to be installed has not as yet been determined.

CRIB WORK.

Expense has been no object to either company in the crib work and concrete pier construction on the lake front. In fact, the Pennsylvania's concrete pier in the main river has been built to last for ages. The

pier is two 12 x 12 white oak wale strakes running its entire length. These are made fast to the side of the pier by one and one-eighth inch rods which extend to the other side through inch and half gas pipe. This makes it possible to renew them

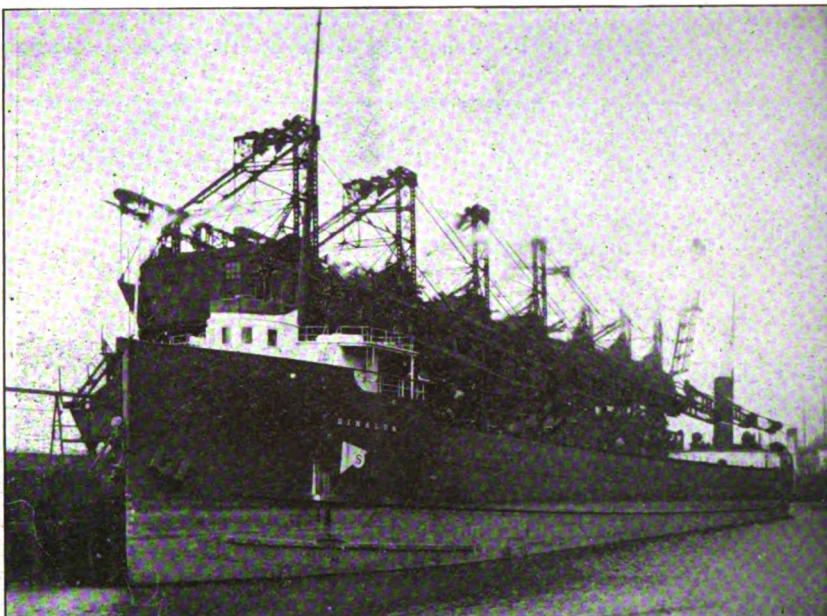
The Pennsylvania conveyors will store ore in a 4-ft. concrete depression, which gives increased storage capacity.

ASHTABULA'S HISTORY IN PICTURES.

Ashtabula's history is told better by the pictures which have been taken from time to time. The accompanying views show the entrance to the harbor in 1873 and the interior up beyond the old pontoon bridge as it was in 1874, looking north and south. The harbor entrance picture has been used through the courtesy of Capt. James W. Calloway and the others through John Thayer's kindness. So far as is known, they are the only original pictures in existence.

The harbor entrance is as primitive as it could be with the old lighthouse at the end of the east pier in a spot which would correspond with the Pickands, Mather & Co. coal dump now. The schooners lying at the pier are supposed to be the Thos. W. Ferry and the Kate Gillett. The two-masted schooner lying on the west bank at the right-hand side of the picture is the Vampire, built at Ashtabula in the old days. The identity of the other schooner at the west side of the harbor entrance has not been learned.

In the days when the picture was taken, the railroads had not yet cut



UNION DOCK, STEAMER SINALOA UNLOADING.

Lake Shore engineer figures his docks will last for fifteen years, after which time new conditions may arise to make changes necessary.

The concrete pier rests on solid shale rock, to which it is anchored by seven-foot car axles. The rock was excavated to give a uniform depth of 21 feet below the mean lake level. Two feet below the water is the deck of the cribs from which the concrete is laid. The cribs are 19 ft. high and the concrete extends up 9 ft. The bottom of the crib is 25 ft. across and the decks are 12 ft. across. The top of the pier is 8 ft. wide.

Each crib on the Pennsylvania contains 250,000 feet of timber, 40 tons of iron and they are all filled with shale rock. The car axles are set 4 feet in the rock and three in the crib. There are two set every 8 ft. like this. The timber used was all 12 x 12 hemlock and it is bolted in every conceivable manner to add strength to the structure.

Seventy-five yards of concrete are set in every 25 ft. of pier. Expansion joints made in a V shape with five layers of three-ply paper are found every 25 ft. Iron mooring posts are set in the concrete every 50 ft., each one weighing 1,300 lbs. They are anchored with heavy rods sunk in the concrete.

The novel feature of the concrete

when necessary without having to cut away the concrete to do it.

The Lake Shore crib work is similar to the Pennsylvania's, except that



SUPERIOR NO. 1, MINNESOTA SLIP.

2 ft. below the water line a superstructure of white oak will extend up 6 ft. above the surface of the water, making the dock. The cribs are also filled with Kelly Island limestone instead of shale rock hauled by boat and by rail.

in on the lake trade. As can be seen from the picture, the warehouses of the different merchants were still standing, and they are mute testimony of former busy times. Hubbard & Co.'s old yellow warehouse is located under the tree at the right and on the

east pier is Morey's hotel, Humphrey's grocery and warehouse and Seymour's warehouse and the Willard Wells &

warehouses bring back memories of Ashtabula's steamboat days, when all the boats trading up or down would

goes shipped out, oftentimes as far west as Chicago, consisted of grain and baled hay, dressed beef, cider and



VIEW OF ASHTABULA HARBOR IN 1873.



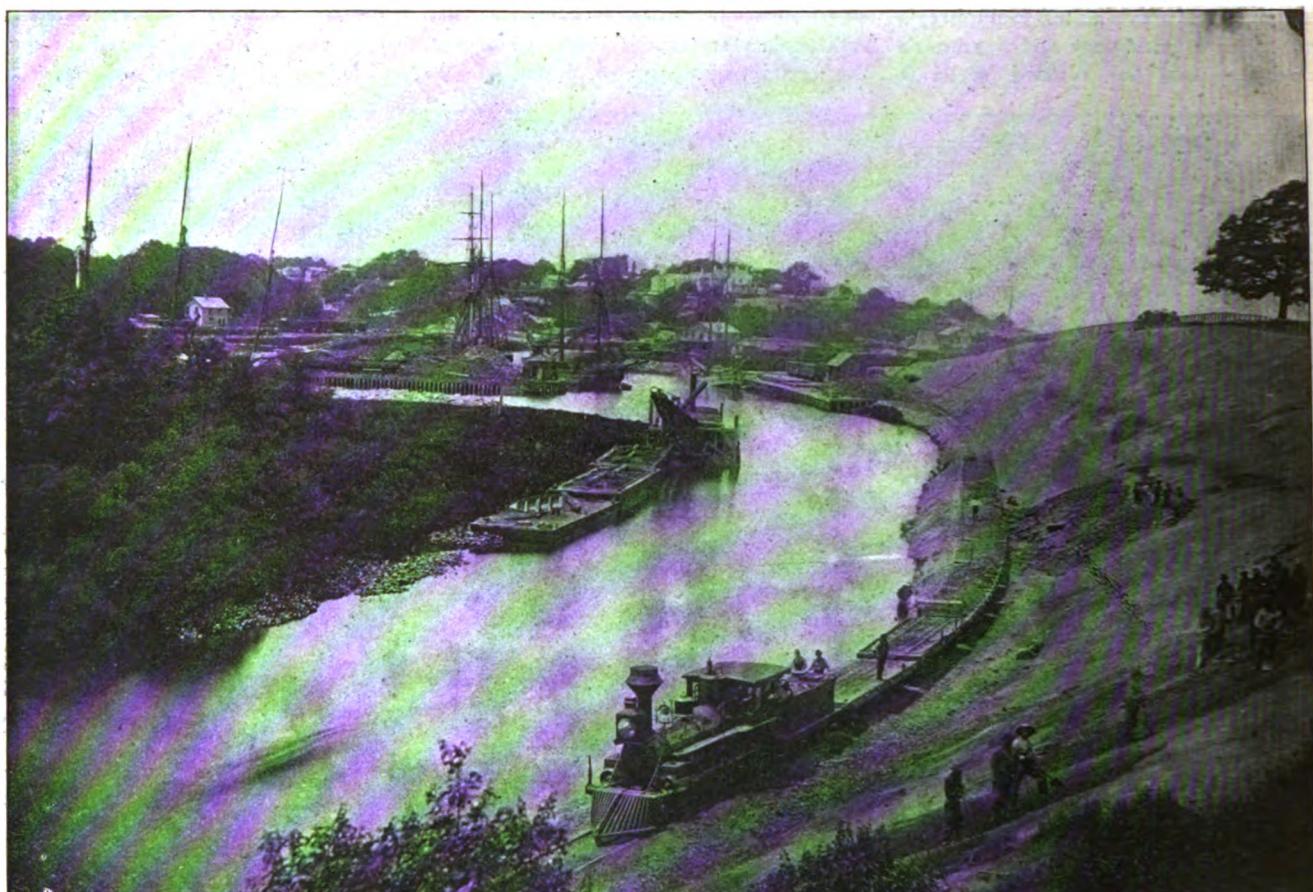
ASHTABULA HARBOR AS IT APPEARED IN 1874.

Co. warehouse. The buildings back of the pier are the hotel barn and a private dwelling house.

The Morey hotel and the different

make regular stops to pick up or put off freight or passengers. They would stop at the piers where the water was deep enough for them. The car-

apples. The cargoes received were general merchandise mostly, but barrel staves and lumber were also big items.



VIEW OF ASHTABULA HARBOR TAKEN IN 1874.

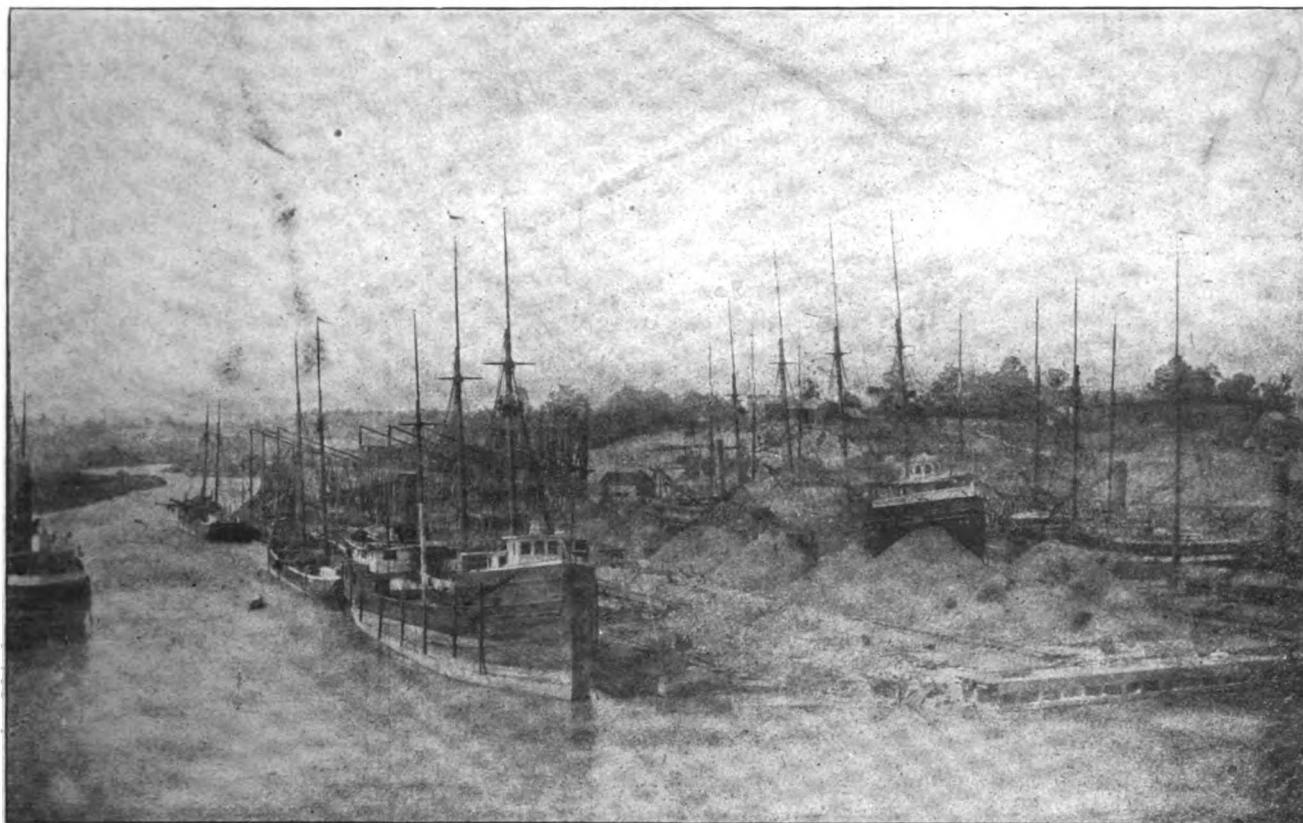


ASHTABULA HARBOR IN 1875.

Capt. Albert Field, the 80-year old proprietor of the Fisk house, has vivid memories of the days when he

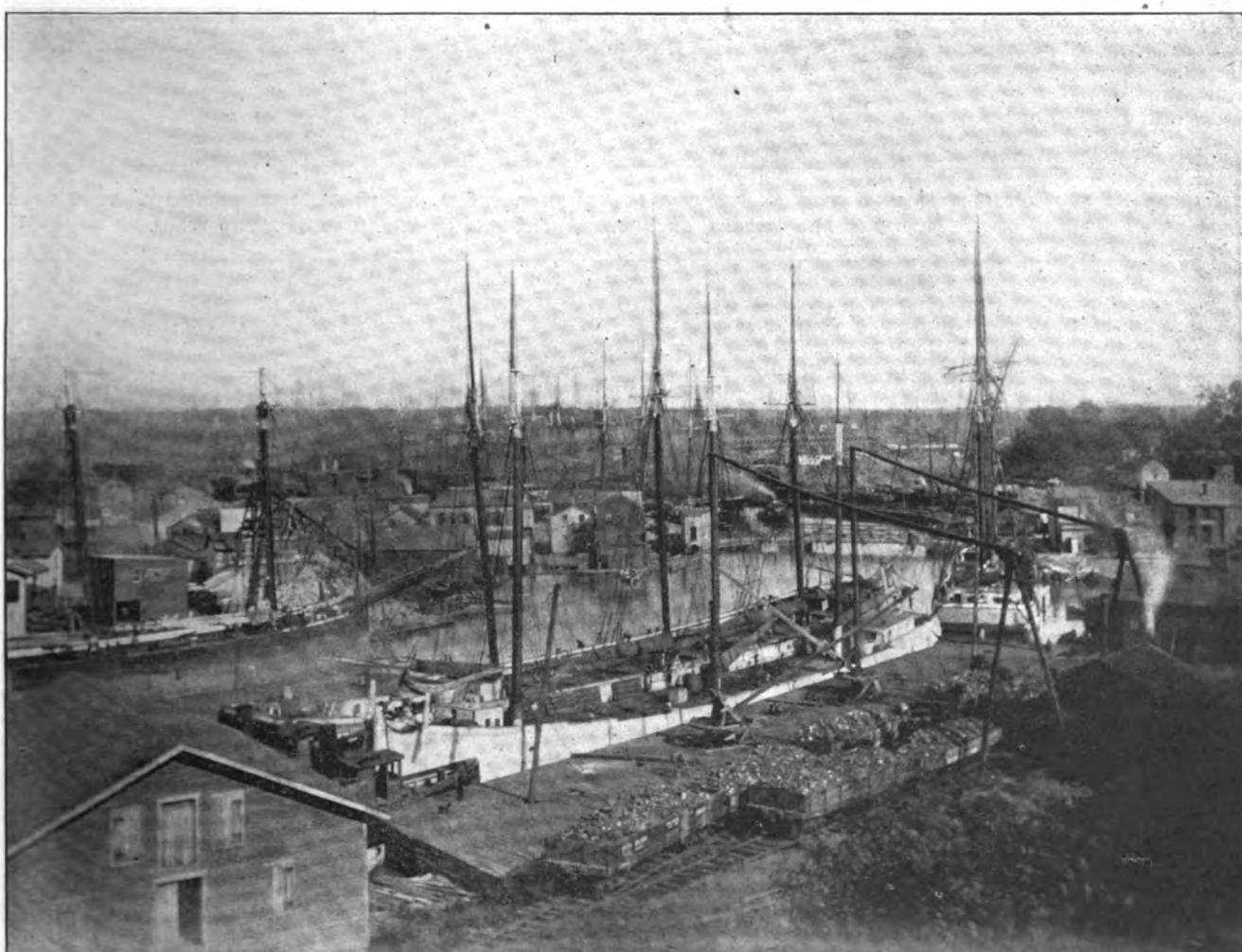
wheeled on the old side-wheel steamer Ben Franklin. She ran between Buffalo and Toledo, but stopped at every

intervening port on the south shore, as well as Monroe. He says that passengers and package freight made up



P. Y. & A. SLIP AND OLD HANNA COAL DOCK.

From an old photograph.



VIEW OF ASHTABULA HARBOR IN 1884.



THIS PICTURE SHOWS THE TWO LONG TRESTLES FORMERLY IN USE ON P. Y. & A. NO. I DOCK AFTER LOCKPORTS. THEY WERE WOODEN STRUCTURES AND WORKED ON SAME PRINCIPLE AS BROWNS. USED ONLY TWO YEARS.



UNION SLIP AS IT LOOKED IN 1885 WITH LOCKPORTS AND NOBLE & HALL MACHINES ON NO. 4 AND BROWNS AND LOCKPORTS ON NO. 5 OR THE UNION DOCK.

their business, but lumber and grain was also carried. In those days, he says, the east pier would have to be built out at regular intervals on account of the beach making too fast.

Capt. Field was on the Western Metropolis when she used to make the

gine Lion with a train of flat cars and a gang of men loading some of the clay bank. This bank began to fall away in '74 and it was necessary to resort to this method to keep the river clear. The first dock on the east side of the river is the Lake

Bell. On the ore dock are the old Lockport machines used to unload the ore. At the corner of the dock the schooner Timothy Baker is seen, while behind her is the bark Peshtigo. The old Ohio Exchange hotel is visible on the top of the hill just over O'Neil's store.

The crab apple tree seen at the right of the picture on the hill, is one which stood just about where the Lake Shore's water tower does now and a little north of the cut over which the Columbus street bridge runs. John Thayer lived just south of this tree on what is now called Thayer's hill, and he was in the habit in his younger days of picking the apples on this tree.

According to the picture, Bridge street, the busiest street in the Harbor, was nothing more than a clearing in the woods. It came along then just below the P. Y. & A.'s depot, which is shown at the left with a passenger train and freight cars lying on the tracks. Daily passenger trains ran to the Harbor in the old days.

The picture taken in 1884 shows the "old yellow warehouse;" the Haskell dock with the "grasshopper" rigs for loading coal; Humphrey's lime kiln, behind which the McKinnon Iron Works is now located; the old pontoon bridge, widened considerably at that time; Devney's ship yard,



UNION SLIP AS IT LOOKED IN THE LATE 80's.

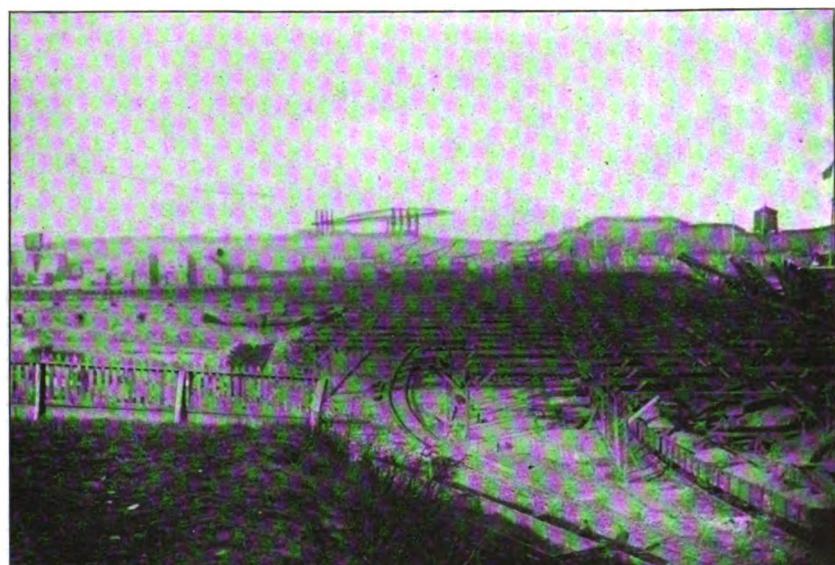
run from Buffalo to Cleveland in eight hours and a quarter, he says. The people would come by rail as far as Buffalo and then by boat to Cleveland, where they would again take the cars for the south. There was only a nine-hour interval to catch the trains, so it needed speedy boats.

Ashtabula was primitive in many ways in 1873 and 1874. As will be seen in the picture looking up the river from Humphrey's lime kiln, there are only three buildings of any consequence in sight. The tug Dexter lies by the bridge and O'Neil's ship chandlery store. The Canadian schooner Pictou, laden with Coburg ore; the Starling, just unloaded; the Jane Bell and the steamer Wm. H. Barnum, in the P. Y. & A. slip are the only boats in port.

In 1874 the river bed made a long circuit to get up to the end of the valley. It can be seen winding its way down to the lake but the peculiar shaped peninsula known as Plum Point does not show. In the picture which looks up the river Plum Point comes in just beyond the wooded area beside which is a dredge. This was dredged away in later years to give the Lake Shore quicker access to the main river. This made a winding basin and allowed for two slips now in active use.

The picture taken looking down the river shows the old Lake Shore en-

Shore's No. 1 and the building standing on it is the first Lake Shore depot. This depot was erected in about forty-eight hours to hold the harbor rights obtained by the railroad. The



OLD-TIME TRESTLE WORK ON P. Y. & A. SLIP DOCKS WITH LOCKPORT MACHINES.
NOBLE & HALL MACHINES ON LAKE SHORE'S OLD FOUR. NO. 1 DOCK CAN BE
SEEN ON EAST SIDE RIVER.

schooner Starling is lying at the dock waiting to be unloaded.

On the west side of the river, are dump scows and the Lake Shore's dredge Hercules. Further on in the P. Y. & A. slip is the schooner Jane

across from the Haskell dock; what is now Cheney's store, and a great collection of schooners. Over the top of the buildings on the east side of the river can be seen the two white stacks of the old steamer Progress,

which foundered last year on Lake Michigan. The harbor as it looks in 1906 is not the same place as it was then.

HOW IS THIS M. A. HANNA & CO.?

As can be seen from the accompanying picture, the old Lockport ore-unloading machines were extremely primitive compared to the modern clam shells and grab buckets. When they were used, the rule was to put only two on a boat. This was customary because they required a forty-foot space to work in. An incident which came up in 1879 shows how strongly the rule of two machines was adhered to.

It is authentically related that M. A. Hanna & Co., at Cleveland, wrote to Scott & Co., at Erie, protesting against using more than two machines on a boat, saying J. P. Manning, Lake Shore agent at Ashtabula, was using more than two. Scott & Co. referred the letter to Mr. Manning with the inquiry endorsed on the letter: "How is this J. P.?" The reply from Manning was characteristic.

"The Lake Shore railway," he responded, "put me here to work for its interests and as long as I am here I will do it."

There was cause for complaint be-

day, if freighters could be unloaded on both sides shippers and owners would be highly pleased.

The Lockports and what were known as the Noble & Hall machines

wheel was used to carry the horizontal engines over the center.

As may be seen on the modern steam shovel, the Lockports and Noble & Halls had jack screws at each



NO. 2 DOCK, LAKE FRONT, WITH TEN BROWNS, AS IT LOOKED IN THE EARLY 90's.
THIS DOCK WAS CONSTRUCTED AND PUT IN OPERATION IN '91. SUPERIOR
DOCK NO. 1 HAD NOT YET BEEN CONSTRUCTED.

were both alike except that the former had a friction and the latter a clutch gear for hoisting and lowering. The cranes swung in a half circle by

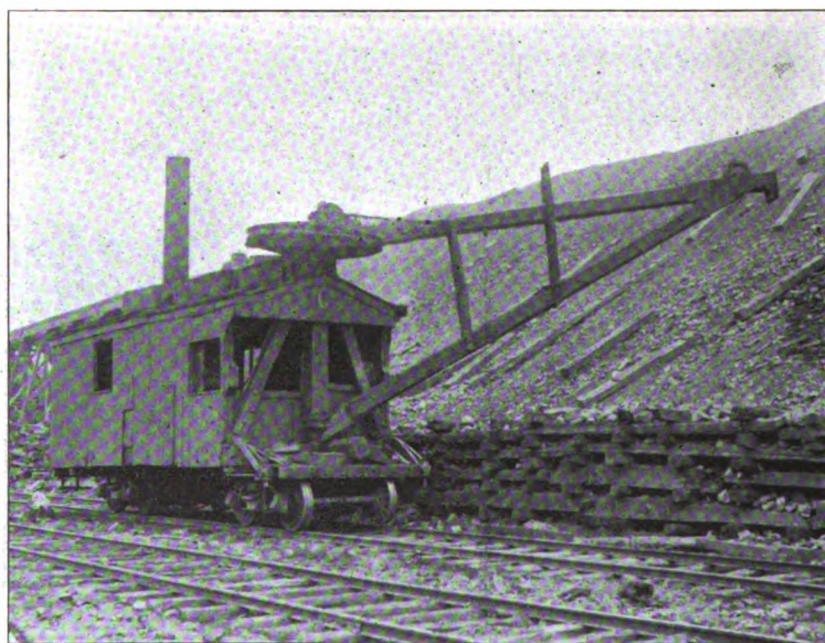
corner in front to hold them down and keep them from tipping over. Tubs and one-ton buckets were used on the machines.

The M. A. Hanna Co. is still using seven Lockports in the "Lane," where P. Y. & A. dock ore is still stored. This is up beyond the Lake Shore draw bridge.

TOPKY BROS.

Topky Brothers, whose ship chandlery establishment can be seen in the advertising columns of the MARINE REVIEW, started in business in 1886, and located in their present store in 1890. As time went on, they were prompted to add several buildings on account of the increasing demands of captains and engineers on the modern freighters. They have endeavored to keep abreast of the times by keeping their stock in shape to meet any demand from either the forward or after end of the boats.

The new carferry steamer Ashtabula, operating between Ashtabula and Port Burwell, was tested last week and fulfilled every requirement. With a full load of thirty cars of coal, the ferry made better than fifteen miles an hour. The actual running time of the round trip between Ashtabula and Port Burwell was nine hours and 25 minutes.



OLD LOCKPORT MACHINE FORMERLY USED ON P. Y. & A. DOCK, NOW USED IN PENNSYLVANIA STORAGE YARDS, KNOWN AS THE "LANE."

cause Mr. Manning had some time before instructed his foreman to put on three machines. His action must have been the starting point for the desire to get boats out quickly. To-

means of a swinging gear. The friction wheel was attached to an intermediate shaft which was connected to a spur gear and this was attached to the hoisting drum. An immense fly

DOCKS AT ASHTABULA.

Ashtabula harbor has ten ore docks, of which five can be called modern. In addition to these, there are three coal dumps. The new improvements

given up when Plum Point was dredged out.

No. 4 dock, which is located at what is now called the Union Slip, was constructed in '79, being then

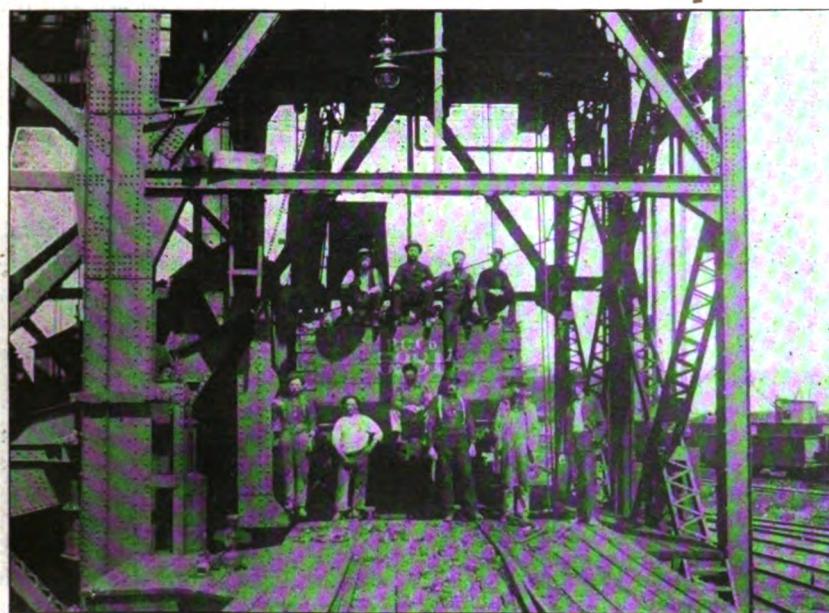
the slip in 1879 and 425 feet were added in 1882, making a 1,325 foot frontage. Three Brown hoists were erected on it in 1885 for coal and ore. Three more Browns were put on the same year. These were superseded by the Brown hydraulic coal machine in 1896, and the latter was succeeded by the seven Hoover & Mason 5-ton clams now in use. This dock is now known as the Union dock, working day and night.

No. 6 dock, up the old river bed, known as the Mahoning & Shenango or M. & S. dock, was operated with eight Browns and three McMyler whirlies in 1890. They are still in use, though the operating company is waiting on the Lake Shore to install new and modern machinery. This dock only works days.

No. 3 dock, the Angeline, almost abreast the P. Y. & A. slip, was operated in 1889 with six Browns and two McMyler whirlies in 1889. Three more McMyler whirlies were added in 1890. They are still in use, but like the M. & S., new machinery will soon be erected. The Angeline does not work nights.

No. 2 dock, lake front, operated by Pickands, Mather & Co., was operated with twelve Browns in 1891, and these are still used on this dock. Only day work is done at this dock.

No. 1 dock, lake front, known as



MCMYLER COAL DUMP AT 5½ DOCK (PITTSBURG COAL CO.) JUST BEFORE THE CAR IS DUMPED INTO PAN AND PAN RAISED TO SHOOT COAL INTO BOAT.

will result in adding more modern docks, and it is rumored that some of the docks now in use will be dismantled when the new docks are put in operation.

Although the P. Y. & A. docks were doing business three years before those of the Lake Shore, it is a fact that the Lake Shore now has more than the P. Y. & A. The reason the Lake Shore got started so late was that the officials overlooked the harbor and finally got in at the eleventh hour and began operations in '76.

No. 1 Lake Shore dock was constructed in '73. It was located at the first bend in the river above the bridge and was 300 feet long. Two Noble & Hall machines were put on it in 1879.

No. 2 dock, now obliterated, was located above what was known as Plum Point. It was 312 feet long and was constructed in 1873 and 1874. Hurt automatic unloaders were installed on it. These consisted of a tower, boom and track. The ore would shoot up the boom, in one-ton buckets and trip with whiffle tree and angle iron and then shoot back.

No. 3 dock, 300 feet long, was built in '73 and '74 above Plum Point. It has also been obliterated, but while it was in use, the old style trestle coal chutes were in operation on it. Both No. 2 and No. 3 docks were

1,000 feet long. In 1882, 450 feet were added. It is now called Superior No. 4 and is leased by the Carnegie Steel Co. Six Noble & Hall ma-



GROUP OF HOISTERS TAKEN AT MAHONING & SHENANGO DOCK WHILE WORKING A BOAT OUT.

chines were installed on it in 1882 and Superior No. 1, and operated by the two Lockports. Four Brown hoists were Carnegie Steel Co., started with ten put on it in 1887, two more in 1888, Browns in 1894, and three Hoover & and six Varieties in 1888.

Mason 5-ton clams were put up in

No. 5 dock extended 900 feet along 1902, three more being added in 1905.

This dock works day and night. The P. Y. & A. No. 1 dock was operated in 1873 and was constructed before any other ore or coal dock in the harbor. Coal was shipped from it, June 25, 1873, and ore was received over it, July 11 and 12, 1873. Lock-

ets opening at the bottom, and whirlies for hoisting was the last in use there. It was erected about 1888.

In 1884, ring-arounds or grasshoppers were in use on No. 1 and the old Haskell dock below the bridge on the west side. These were derricks with

scrapers. The Fast Hoists and the scrapers are operated by electricity.

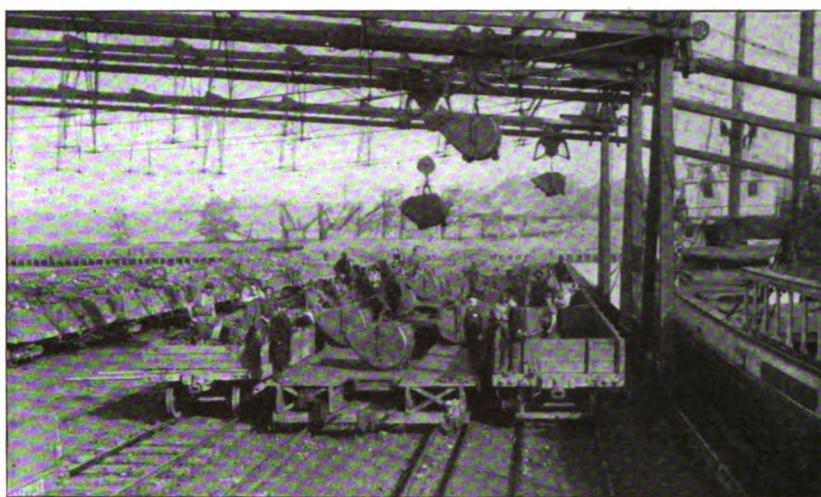
What is known as the Portables dock, was constructed in '85. It was equipped with eight machines, which operate on the same general plan as the Browns, but two burned and there are only six now. This dock is still in operation, and it is also equipped with Hulett grab buckets.

The coal trestle went out of commission in 1903 and the McMyler car dump on the lake front was put in operation in 1904. This differs from the Pittsburg Coal Co.'s McMyler, the machinery being on the ground.

There are twelve machines on each side of the P. Y. & A. slip.

All of the docks at Ashtabula are operated by outside interests, who lease from the Pittsburg, Youngstown & Ashtabula Railway Co. and the Lake Shore & Michigan Southern Railway Co. Mr. D. F. Flower is agent for the former, and Mr. J. P. Manning for the latter.

On the Lake Shore side of the harbor, Superior docks Nos. 1 and 4 are operated by the United States Steel Corporation with Mr. J. E. Savage as superintendent. Dock No. 2, No. 7 or the Ashtabula clams and the McMyler car dump are operated by the Ashtabula Dock Co., with Mr. E. S. Henry as superintendent. Dock 3, or the Angeline; dock 5, or the Union, and dock 6, or the Mahoning & Shen-



BROWN COAL LOADERS IN OPERATION ON THE STEAMER GEORGE SPENCER.

port machines were used to unload the ore. Four of the machines had been imported from Erie in March, '73. They were carted from the up-town depot to the harbor.

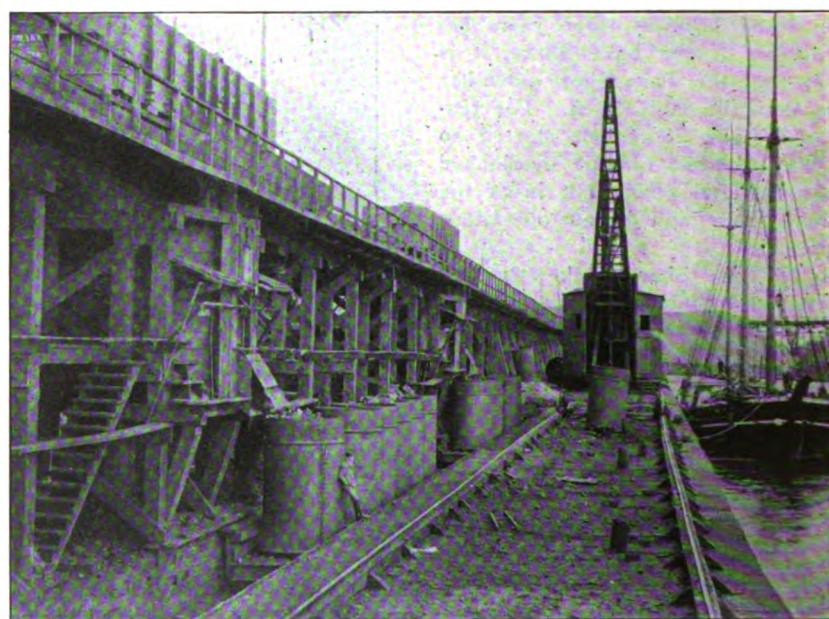
In the fall of '73, a dredge was brought from Erie to dredge out the P. Y. & A. slip, where No. 2 and No. 3 docks were built. These are now known as the Kings and Fast Hoist docks. The Kings, or No. 2 dock, was ready first, and the four Lockports were moved round the end of the dock and put in place there. It was not till 1876 that the slip was being operated full blast, both sides being complete then. Three more Lockports were then secured.

Just exactly how long the Lockports were used is not known. When business was rushing in the slip, boats were unloaded on No. 1 with horses and wheelbarrows. A few years later, a man was sent from Cleveland to erect two long wooden trestles running east and west on No. 1. These were operated like the Browns, and must have been the first attempt at the modern conveying machines. They were only used two years.

In '82, the McMyler "whirlies" were put on the slip docks, and the Lockports were moved to No. 4 dock, which was located where the carferry slip is now, just back of the Fast Hoists. It was afterward called 4½. It was originally an ore dock, but was soon used for coal. The Lockports, ring-arounds or grasshoppers, and a trestle were all used on this dock. The trestle with big cylindrical buck-

long inverted booms which were operated by steam. Whirlies were afterward put on No. 1, and later moved on a scow to the Haskell dock.

The P. Y. & A. slip docks, Nos. 1 and 2, first had Lockport machines, then McMyler whirlies and then King machines, similar to the Browns. The latter were put up about 1890. In the



M. A. HANNA'S 4½ DOCK WITH COAL TRESTLE, MCMLYER WHIRLIE AND BUCKETS OPENING AT BOTTOM FOR LOADING BOAT.

early eighties, this slip had a coal chute at the upper end for fueling boats. The Kings and the Fast Hoists are now equipped with 2-ton Hulett grab buckets and Andrews

ango, are all operated by W. G. Pollock, of Cleveland, with Mr. J. H. Burton as superintendent. The latter is also superintendent of dock 5½, or the Pittsburg Coal Co.'s McMyler car

dump. Mr. Jay M. Amsden is superintendent of the four P. Y. & A. docks operated by M. A. Hanna & Co.

The men who operate the docks are as follows:

Superior Docks Nos. 1 and 4.—Master Mechanic, H. G. Gary; Chief Engineer, C. E. Cahoon; Ass't. Master Mechanic, J. Irwin.

Foremen.—C. C. Wilson, B. J. Palmer, W. E. Kennedy.

Hoover-Mason firemen.—S. J. Urch, J. B. Van Pelt.

Hoover-Mason Operators.—J. Clint, J. Duffy, J. P. Findley, F. Gage, A. C. Howard, A. N. Johnson, G. Lewis, T. Miller, O. H. Perry, N. Swanson, H. Van Pelt, E. M. Ward.

Engineers.—A. Anderson, F. B. Ashley, E. Andrus, W. Brazie, A. D. Bowen, J. Bourkland, A. L. Bailey, A. W. Brazie, W. Baird, W. Cook, D. O. Collar, W. Cook, C. J. Casbourne, H. W. Campbell, R. Cook, V. Denslow, T. J. Elliott, W. Grasmehr, A. M. Howard, E. Hjelm, H. W. Hutchinson, W. S. Hewins, R. Hegfield, L. L. Hopkins, W. Hewitt, C. L. Higgins, J. Johnson, E. Jeffords, J. Kusik, H. Lukala, C. Laskey, H. W. L'Hommedieu, C. Lawrence, H. S. McNutt, R. F. Massena, J. A. Nettleton, A. E. Nelson, E. Pyburn, F. W. Rogers, L. L. Seymour, J. Stearns, H. T. Stearns, P. E. Seamens, A. L. Strickland, I. Spaulding, C. Strauss, H. A. Sprague, M. Sherry, F. R. Scott, J. Thompson, E. Whitlam.

Gang Foremen.—C. Anderson, J.

Trimming Foremen.—E. M. Burnett, A. Pomare.

Watchmen.—C. Parnell, P. Sherry.

Blacksmith.—L. S. Sharp.

Blacksmith Ass't.—F. E. Shepherd.

Chief Clerk.—G. H. Savage.

Burns, assistant foreman; A. Linkerson, coal dock foreman; E. E. Williams, chief engineer; F. Whitman, J. A. Swap, assistant chief engineers.

Ashtabula Dock Co. clams.—S. T. Cook, foreman; operators, M. Shan-



P. Y. & A. SLIP SHOWING COAL CHUTES FOR FUELING AND A NUMBER OF OLD-TIME STEAMERS.

Clerks.—A. A. Larson, E. W. McClanning, L. C. Wilderson.

Machine Testers.—G. E. Carlson, R. E. Wason.

Number Takers.—C. Flynn, E. Punderson, J. Sherry, H. Urch.

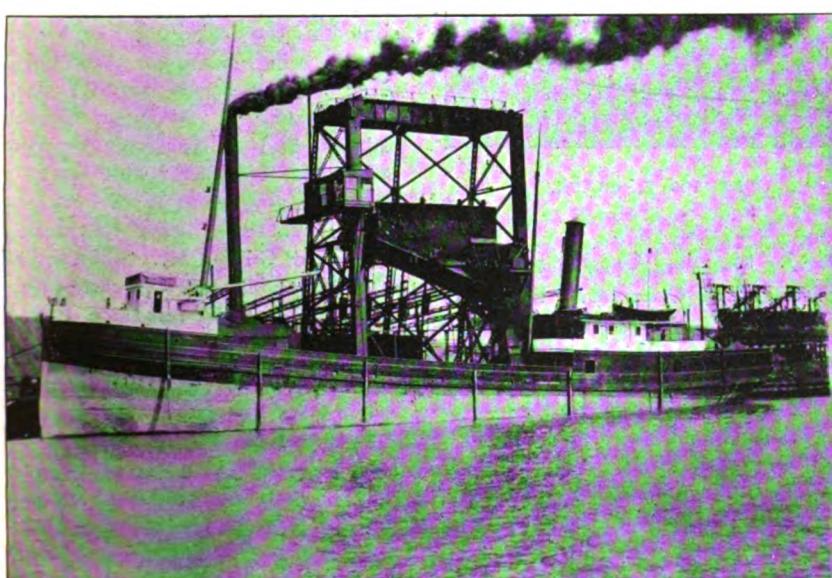
Water Boys.—E. Sherry, W. Story.

non, F. Fitch, W. R. Clawson, W. Hoose, H. O'Brien, engineer; C. W. Smith, fireman; M. Benson, R. Hegfield, oilers.

Ashtabula Dock Co. Brown hoists.—F. M. Burns, foreman; A. Mapous, blacksmith; J. E. Hall, blacksmith helper; F. Whitman, engineer; C. H. Talcott, electrical engineer; C. H. Bartram, electric lineman; engineers. James Dovan, J. Lewis, C. W. Briggs, Ole Johnson, E. Hummer, J. King, M. Rendrick, J. E. Palo, C. Welsh, A. Tobias, F. Salca, R. Laskey, G. Daniels, E. J. Kittinger, J. Mello, P. D. Clair.

Ashtabula Dock Co. car dump.—A. Linkerson, foreman; J. A. Swap, operator; E. Cowan, pig operator; O. J. Nevison, chute operator; C. D. Fox, engineer; D. Otto, fireman.

Angeline docks.—P. H. Hageney, chief engineer; Morse Powers, assistant to chief engineer, Mike Driscoll, foreman; Emmet Weldon, engineer in charge; Luke Mills, blacksmith; R. Bissett, blacksmith helper; Con Driscoll, night watchman. Engineers.—Charles Stewart, Mike Driscoll, Sam Clint, John Hageney, Edward Duffy, Tim Murphy, F. L. Croden, Al Finley, George O'Brien, John Mahoney, John Norton, John Rasey, Harry Thompson, James Clint, Fred Colson, Charles Robinson, James Vossalier, Anthony Smith, Wm. Eldridge.



PICKANDS, MATHER & CO., MCMLYER COAL DUMP AT EAST SIDE HARBOR ENTRANCE.

Blasko, G. Cross, C. Dimarchio, D. Frabott, F. Larson, J. Mello, G. Musik, J. Motsko, G. Musik, Jr., S. Nelson, J. Olson, J. Tobias, H. Thompson.

Ashtabula Dock Co. office force.—C. E. Hebard, assistant superintendent; F. H. Burnett, cashier; J. Konrad, ore clerk; H. C. Henry, coal clerk; S. F. Cook, foreman; F. M.

Mahoning & Shenango docks.—H. H. Harps, foreman; S. W. Taylor, engineer in charge. Engineers.—John Madden, John Keenan, Tim Glazier, A. C. Frazier, Robert Sidley, Giles Hawkins, Mike McKernan, Luke Kelly, Ed. King, S. W. Masten, A. J. Brewer, Wm. O'Brien, Harry Harps, Fred Melspaugh, George Brown, John Sherry, Richard O'Brien. Charles Driscoll, night watchman.

Union dock.—M. H. Harps, Tom Doyle, foremen; Wm. Lewis, engineer in charge. Engineers.—Michael Kelly, Tom Hassett, Frank Cahill, Nick Connick, Tom Clair, Wm. Way, John Bowler, Ed Culliton, James Bowler, James Cose, Joe Keenan, Frank Eddy, Frank Webber, Charles Alfred, Wm. Finley, James Keenan, James Cartner, Gus Olson, Louis Martin, William Driscoll, William Madden.

Pittsburg Coal Co.'s dock.—J. P. Manning, Jr., O. E. Skoog, foremen. Engineers.—C. D. Faulkner, Charles Devereaux, John Condron, W. L. Hageney, Frank McGraw, James McDermott, Wm. Hackett, George Hennigar, William Pollock, F. J. O'Rourke.

Fueling Scow Black Diamond.—Captain, Wm. E. Mallory; engineer, John Joyce. Firemen, Richard King, Frank Rowan, Elmer Alfred; tunnelmen, James Ross, Alfred Reno.

Angeline, Mahoning & Shenango, Union and Pittsburg Coal Co.'s docks office force.—J. M. Kennedy, cashier; C. C. Driscoll, general foreman; P. H. Hageney, chief engineer; R. W. Dingee, O. J. Dingee, C. H. Irwin, E. S. Harps, E. L. Walkley.

Pittsburg, Youngstown & Ashtabula Ry. Co. docks.—Clerks, D. W. Reed, M. P. Tyler, L. S. Sherman, W. E. Berry, C. H. Hampe; foremen, T. H. Daly, general, John Swedenborg, Tom Scott, C. F. Daly, L. G. Garrison, Fred Gillette, W. L. Palmer, F. O. Collar; number takers, A. B. Collar, Lee Streeter; F. H. Schlegel-milch, master mechanic; Geo. Swedenborg, assistant master mechanic; machinists, E. C. Askew, Dan Sutter, W. D. Stearne, John Makynen, Jr., Cliff Brown; blacksmiths, J. Tenhonen, Oscar Johnson, J. Wists, J. Hyverinen, W. H. Brown, J. Tuamala, E. Hakkio, Matt Tuamala, Andy Maki; carpenters, F. G. Crozier, Geo. McCarty. Fueling Scow (Geo. B. Rasser)—Captain, S. A. Cline; engineer, Ed. Ball; firemen, Alex. Peterson, E. J. Ball; watchman, H. Rintoo.

Wire gang.—J. Wallender, G. R. Elliott, Carl Gustafson, Thos. Blair, Isaac Hautamaki, Henry Johnson.

Power Plant.—Electricians, Geo.

Hamm, A. Freed; engineers, L. C. Whelpley, Geo. O'Keson firemen, J. Toppari, J. Raitto, E. Neami, L. Hon-ganan.

Motormen.—F. Burpee, F. Olin, Chas. Scott, J. Maunus, Lynn Olin, Harry Barrett, Mart Garrison, Victor Russki. Oilers on Kings.—O. Helder, J. Tapala. Oilers on Fast Hoist.—Portables—H. Korkalti, Isaac Kar-pakka.

King Machine Engineers.—D. C. Randall, A. S. Keep, C. H. McNutt, N. Johnson.

Hoisters.—J. Stanley, A. P. Freed, W. C. Williams, F. M. Seymour, R. White, H. E. Bartlett, C. P. Calloway, F. B. Wetmore, John Hakla, E. Whelpley, P. Carlson, D. H. Reed, D. D. Harley, W. C. Andrews, W. H. Braughton, Chas. Olson, H. M. Bart-



EDWARD E. GILLEN.

lett, J. Sippola, Oscar Lauttanen.

Fast Hoist Operators.—E. Muuhhan, G. H. Crawford, W. A. Stewart, Andrew Johnson, E. Rantala, M. Mempaa, Victor Kosky, M. Joki, A. Kottla, M. Witto, John Mietty, J. Kykyri, C. Longhed, John Juhola, J. Orquist, J. E. Bakkala, O. Ronberg, Eric Aho, K. Makala, E. Arkelander, A. Krook, P. Heikkury, John Killiner, Herman Hapala.

Portables.—Engineers, Con Sullivan, W. Russell, N. W. Brazie. Hoisters, T. Baldwin, T. Tarbell, Pete Jepson, J. Sanborg, Alfred Freed, Guy Mills.

Coal dump.—N. Swedenborg, Ed Hakala, P. Coyne, Wm. Coyne, J. Ketcham, J. Starra, Chas. Brown, J. Carlson, J. Makynen, J. Karhu.

EDWARD E. GILLEN.

Edward E. Gillen, of Racine, Wis., who is vice president of the Edward Gillen Dock, Dredging & Construction Co., is probably the youngest man on the lakes engaged in such a responsible position. He, however, would have been a physician if his studies had not been interrupted by a serious injury to his knee. His teachers regretted his leaving them because he had stood at the top in his class, averaging 93 per cent in his first exams.

Mr. Gillen was born at Racine in 1877, and he went through the public grammar and high schools of that city. He graduated from these while quite young and then started in at the Physicians' and Surgeons' College at Milwaukee, resolved to be a doctor. His ambition was not realized in a medical way, but for the past six years he has been gaining fame around the lakes in his present capacity. He was just old enough to vote when he took charge of the Sheboygan breakwater construction in 1900.

In 1901, Mr. Gillen worked as assistant superintendent on the breakwater at Michigan City, Ind., going to Chicago when that was completed to assist in the construction of the Ship Owners' dry dock. In 1903, he began work on the 2,500-foot timber breakwater at Chicago, finishing it in 1904. In 1905, he was engaged in dock construction at Racine, the last two jobs being for his own company.

In August, 1905, Mr. Gillen was assigned to the biggest job of his short career, being sent to Ashtabula to supervise a \$200,000 contract for the Lake Shore & Michigan Southern railway and a \$400,000 government breakwater contract. This latter consists in laying 3,000 ft. of breakwater, 70 per cent now being complete.

Edward Gillen, Mr. Gillen's father, who is president of the company, has been in the business since the Civil War. He is now constructing a \$100,000 bridge at Racine.

J. P. MANNING.

One of the most striking figures in the business life at Ashtabula harbor is Mr. J. P. Manning, agent of the Lake Shore & Michigan Southern Railway Co. He is a wonderful specimen of the sturdy pioneer and he has been with the company so long, it really seems he must long since have become an integral part of it. He is really the "grand old man" of the port.

Mr. Manning is so close to the allotted three score and ten, he is likely

to pass far beyond it, but he is only just getting gray. It is with marvelous dignity and becoming pride that he will tell you he has been working for the Lake Shore a half century as its agent.

The United States was a wild and



J. P. MANNING,
Lake Shore Agent at Ashtabula.

comparatively unsettled country when young Manning first set his foot from the county Wexford, Ireland. He remained at Philadelphia till he was seventeen and then took Horace Greeley's advice and went west. His trip was of an exploring nature, because he turned eastward again and located in Ashtabula in '56. He started work with the Lake Shore then as telegraph operator and agent.

When the Civil War broke out, Mr. Manning's patriotism carried the day and he left his work to join the Nineteenth Ohio. He was a captain when mustered out, and as soon as he could turn homeward again, he came back to his old work, which was held open for him. It was a few years later, in '73, the first dock was built.

Mr. Manning remembers when it took several days to unload a 1,200-ton ore boat, the only means of doing it being wheelbarrows. He says a 1,200-ton boat in the old days was a whale, most of the schooners being half that size. According to him, the first efforts at handling ore and coal could not have been more crude. It was not till '76 the Lockport machines were installed.

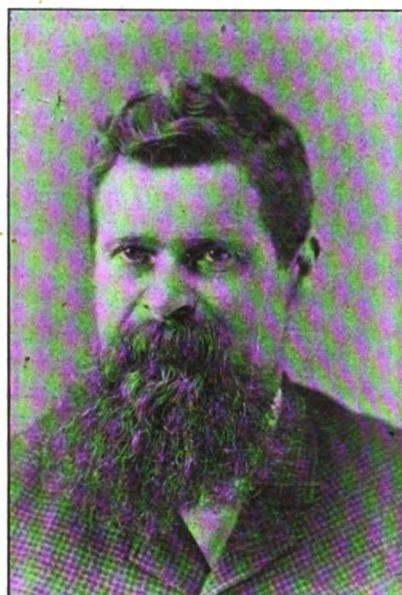
When Mr. Manning came to Ashtabula it was nothing more than an inlet for the light-draught schooners which formerly plied the lakes. He admits that he never dreamed of its

becoming what it has. The old pontoon bridge and the "let-well-enough-alone" policy of those days looked good to him then and he did not claim to be a prophet.

"My ambition to see Ashtabula distance any ore-receiving or coal-shiping port on the lakes is to be realized," said Mr. Manning, "I will live to see the day when 15,000-ton boats will come in and discharge their cargoes. This will be a great contrast to the old 600-ton schooner."

TIMOTHY H. DALY.

Fifty years in the ore-handling business is the record made by Timothy H. Daly, general foreman for the Hanna docks on the Pennsylvania side of the harbor at Ashtabula. He began his career with Scott & Co., at Erie, in '56, and went to Ashta-



T. H. DALY.

bula the first year the railroads ran down to the harbor. He was on hand when the first ore cargo was received, and superintended its unloading.

According to Mr. Daly, the old schooner Maize, a full-rigged, three-masted ship, brought the first cargo of 730 tons to the old P. Y. & A. dock, which extended about 200 ft. south of where the Great Lakes Towing Co.'s office now is. She was worked out July 11 and 12, 1873, with two of the old Lockport machines. He says this was fast time. The P. Y. & A. slip had not been dredged then.

At this time the harbor entrance consisted of an east pier which extended out to a little beyond where the Pickands, Mather & Co. coal dump is now. In fact, Mr. Daly says, the original P. Y. & A. dock was used

for two years before the slip was dredged out and put in operation. In those days the leviathans of the lakes were the Havana, Sparta, Helena, Sumatra and others. Cargoes of 1,200 tons were enormous then.

Unloading with Lockport machines, according to Mr. Daly, was continued in the P. Y. & A. slip, and horses, tubs and wheelbarrows were used on the old dock when the cargoes became too numerous for the slip. A line was rigged aloft and attached to a tub, the horse pulling the tub up at the other end of the line by means of a snatch block. The tubs were dumped into wheelbarrows and wheeled ashore.

Mr. Daly started with the P. Y. & A., July 7, 1873, going with Rhodes & Co. in March, 1874, who took over the management of the docks. When M. A. Hanna succeeded Rhodes & Co., he worked along in the same capacity and he is in his old position now with the M. A. Hanna Co. His work has become more extensive with the change of time and managements.

C. C. DRISCOLL.

Some of the men in Ashtabula have been there so long they have become what might be called an integral part of the town. Cornelius C. Driscoll, general foreman on the Lake Shore side of the harbor for all the docks but those operated by Pickands,



CORNELIUS C. DRISCOLL.

Mather & Co. and the United States Steel Corporation, is one of them. He was on hand in '73 when ore was wheeled off the schooners and coal was wheeled on; in fact, he used to turn to with a wheelbarrow, himself.

The late Geo. B. Raser was Mr.

Driscoll's first employer in Ashtabula, he being agent for the P. Y. & A. and superintendent of the ore docks. He put Driscoll in charge of a gang on the old No. 1 dock, where the Lockport machines were first operated and where wheelbarrows were also an important factor in getting the ore from the boats to the dock.

Mr. Driscoll only remained with the P. Y. & A. for one season, starting in 1875 with the firm of Andrews, Hitchcock & Co. on the Lake Shore side. His immediate superiors then were A. J. McKinney and E. S. Henry. He ran a gang for them till '79, when he was made general foreman. He has held this position ever since.

Mr. Driscoll is now in the employ of the Angeline, Union and Mahoning & Shenango ore docks and the Pittsburg Coal Co., but between now and his first employment with Andrews, Hitchcock & Co., he worked for Scott & Co., who operated at Ashtabula in 1885, later selling out to the Pittsburg Coal Co.

The changes in the methods of unloading ore and loading coal since Mr. Driscoll started in have been very rapid and interesting, but it is worthy of note that he delights in referring to and talking about the old days.

J. C. O'NEIL.

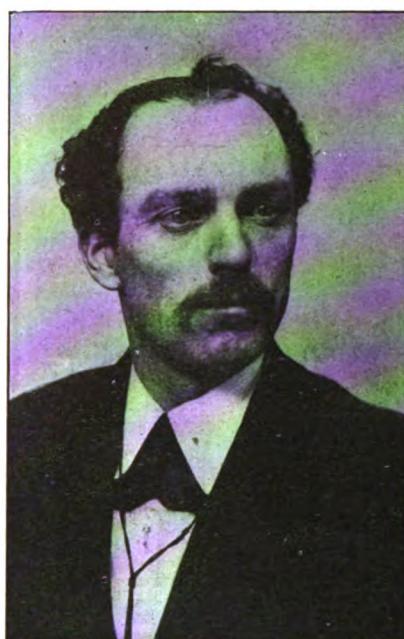
J. C. O'Neil's connection with the lake front improvements at Ashtabula comes through his work as superintendent for the Standard Contracting Co., of Cleveland, which firm took the contract for pier and jetty work as well as making the big fill for the Pennsylvania.

J. C. O'NEIL.

The excellent manner in which the work has been

done is attributable in a great measure to him.

In many ways, Mr. O'Neil can be called a genius, because he is able to turn his hand at almost any kind of work. He was earning a journeyman carpenter's wages at the age of seventeen, and since that time he has



P. H. HAGENEY,
Chief Engineer, Lake Shore Docks.

learned the trade of pattern making and molding and he has also served his time as a machinist. Not satisfied with this, however, he also turned his hand to submarine diving. All of this preparation helped him in superintending pier and bridge construction; which he has done mostly in recent years.

Mr. O'Neil's father and grandfather before him were contractors, his grandfather having assisted in building the first cathedral constructed in New York city. From this, it can be seen that the grandson has inherited his ability in his chosen line.

One of Mr. O'Neil's ways of keeping busy after working hours at Ashtabula was to build an 18-ft. gasoline launch to get around the harbor with in the course of his work.

P. H. HAGENEY.

P. H. Hageney is one of several sons of Erin who made an early appearance at Ashtabula and remained there from the time ore was first received till now. He started his career on dredges at Erie, but went to Ashtabula in '79. He is now employed as the chief engineer of the Angeline, Union and Mahoning & Shenango ore docks and the Pittsburg Coal Co.'s dock.

When Mr. Hageney started to work, the Lake Shore had two machines on the old No. 1 dock, which he says were called Noble & Hall machines. They were similar to the Lockports except that the latter hoisted and lowered away with a friction gear, while the former worked with a clutch. The Noble & Hall also had a double engine.

What is now known as the Union slip at Ashtabula, was dredged out the same year that Mr. Hageney arrived. Seven Noble & Hall machines, he says, were installed on the dock which was built there, called No. 4. No. 2 and No. 3 docks were built in '73 and '74. They were installed with Hunt automatics. These docks were done away with some time later.

Mr. Hageney's work has been of an interesting nature because he has been present to see the rapid evolution of the ore-unloading methods. Using a Noble & Hall machine in the old days was as primitive as could be, compared with the use of the Hoover & Mason clams of today.

J. P. FITZGERALD.

J. P. Fitzgerald, engineer in charge of the Pennsylvania's Ashtabula harbor lake front improvements, is a young man who has made his own way in his profession. He has become proficient by hard work. He started his career under the tutelage



J. P. FITZGERALD,
Engineer in Charge Pennsylvania Improvements.

of the city engineer of his home town.

He spent seven years of his life working in all capacities at Ashtabula with the city engineer and then went

with the Pittsburg & Conneaut Dock Co. at Conneaut, going later to assist in the construction of the Sharon Steel Co.'s plant at Sharon. He afterwards joined forces with the Pennsylvania.

Mr. Fitzgerald worked on all kinds of railroad construction before taking up his present occupation and he has been supervising the lake front improvements since April 1, 1905.

EDGAR C. BOWEN.

Edgar C. Bowen, assistant engineer, who has charge of the Lake Shore's Ashtabula lake front improvements, was born at Fort Brown, Texas, and received his education at the Massachusetts Institute of Technology, graduating from there in '97. Almost a year later, he started active engineering work with the Northern Pacific railway on the construction of the Clearwater Short Line in Idaho.

Mr. Bowen took up work with the United States Engineers Corps at Duluth, May 4, 1899, and remained in that employ till February 15, 1906. In that time, he was in charge of the topographical survey at the headwaters of the Mississippi and in local charge of the river and harbor improvements at Grand Rapids, Mich., and Sioux City, Ia.

Mr. Bowen left the employ of the government while looking after river improvements on the Missouri river

has been working in that capacity since the death of the late George B. Raser in 1901. He had been connected with the Pennsylvania at Ashtabula for many years before this, however, having worked for twenty-seven years in the superintendent's office uptown. He was recently made agent for the carferry ser-

an iron and brass foundry in connection with his plant.

HARBOR TUGS.

There are five tugs used by the Great Lakes Towing Co. at Ashtabula harbor. Capt. Whitney Carr is the local manager of them and E. P. Root, Jr., is the cashier in the office. The names of the tugs and officers are as follows: Fabian, captain, Dan McRae; engineer, M. Joyce; William D., captain, John Mack; engineer, J. C. Donovan; Thomas Wilson, captain, Tim Heagerty; engineer, J. M. Donovan; Sunol, captain, H. J. Coulter; engineer, M. O'Brien; L. B. Johnson, captain, W. J. Robertson; engineer, E. Cassidy.

HARBOR ENTRANCE.

Ashtabula's harbor entrance is 450 ft. between the two concrete piers. It narrows to 315 ft. between the Pennsylvania and Lake Shore dock permits, and is 260 feet between the car dumps. The distance between the outer harbor piers and the new improvements is 1,200 ft.

CHIEF ENGINEER S. M. SYLVESTER.

Chief Engineer S. M. Sylvester, of the new carferry Ashtabula, has been sailing since he was 15 years old, and he has been holding down the after end of carferries since 1892. His first



D. F. FLOWER,
Agent for Pennsylvania Railroad at Ashtabula.

vice established between Ashtabula and Port Burwell, Ont. He resides at the Harbor.

HOWARD E. SMITH.

Howard E. Smith, assistant United States engineer at Ashtabula, has been succeeded in that position by George S. Phelps, junior engineer, of Cleveland. Mr. Smith goes to Albany, N. Y., as division engineer for the New York canal commission. Before going, he was presented with a gold watch by the following who worked under him. W. C. McCreery, Thomas Horihan, Tom C. Frame, J. C. Wilson, George C. Young, John MacRae, O. C. Jones, Chauncey Goldsmith, of Ashtabula, and Wilson T. Howe, junior engineer, J. W. Haskins, Lee R. Goldsmith, Riffe Hodgkin, Robert Goldsmith, of Conneaut. Mr. McCreery made the presentation.



EDGAR C. BOWEN.

to go with his present employers and work on what is known as the "Ashtabula dock extension."

D. F. FLOWER.

Mr. D. F. Flower, agent for the Pennsylvania interests at Ashtabula harbor,



CHIEF ENGINEER SYLVESTER,
Carferry Ashtabula.

work was as fireman on the old Northwest Transportation Co., a Canadian line. He went as first assistant in the Ann Arbor carferries and he first acted as chief in 1896 on Pere Marquette No. 16. He brought out the big Grand

JOHN McLAUGHLIN.

John McLaughlin, proprietor of the McLaughlin Iron Works, which is located at 180 Center street, Ashtabula, formerly worked at the McKinnon Iron Works, but for the last three years he has been doing business in his own plant. He has a complete equipment for the repair work necessary on modern freighters, running

Haven, Pere Marquette No. 18 and his present boat, the Ashtabula.

CARFERRY ASHTABULA.

Ashtabula's new carferry business is being taken care of by the magnificent carferry Ashtabula. She is 350 ft. overall, 330 ft. on the keel and has 56 ft. beam. She has twin screws with two sets of triple-expansion engines. Her



CAPT. B. T. HAAGENSON.

equipment is complete for work from one end of the year to the other, being designed to crush ice and having plenty of power to do it. Her licensed officers are: B. T. Haagenson, captain; T. C. Smith, mate; A. J. Buchanan, second mate; S. M. Sylvester, chief engineer; Thos. Elliott, first assistant; Wm. Wenk, second assistant. The Ashtabula carries freight and passengers and is now maintaining a tri-weekly schedule.

HISTORY OF ASHTABULA.

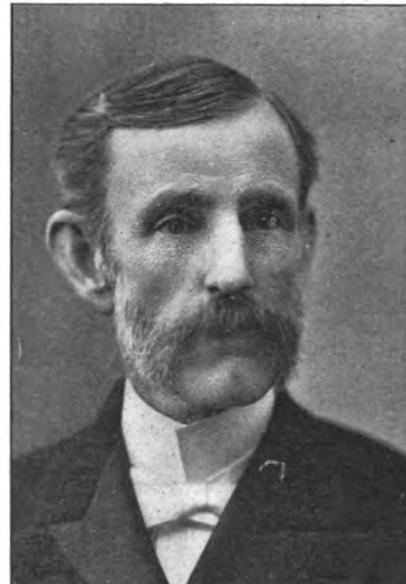
Ashtabula's history dates back to the days of the red man; in fact the town bears an Indian name and will forever be distinguished from many others for this reason. The Indians named the river "Hashtabula," signifying "full of fishes," and the town has always retained the name. Every Indian name signifies some noted feature when given to towns or rivers or any part of nature. It is related that General Moses Cleveland, in 1796, tried to name the site, "Mary Esther," after his daughter, without success.

Much of the commerce of Ashtabula county was formerly concentrated at the harbor. The local merchants began by shipping lumber, timber and staves and then turned their attention to such utilities as

pork, beef, flour, potash, wines and whisky. Coincident with this latter trading, the boats plying up and down the lakes made it a regular point to take on and let off passengers and freight.

There are really two parts to the town, but both go by the one name of Ashtabula, the word harbor often being tacked on, however, to distinguish it from the uptown part. The first settlement of the two towns was made by Thomas Hamilton in 1801. He erected a log cabin above and on the west side of the harbor entrance. When he was building it the Austin family came in from the lake in a boat. Judge Austin gave him a hand in the construction. Hamilton soon after left the town.

The first family to settle in the place was that of George Beckwith, who moved from Austinburg in 1803. During the following January, Beck-



L. W. JARVIS.
Deputy Collector at Ashtabula.

with perished in the snow just beyond the town line between Saybrook and Ashtabula. He had been to Austinburg for provisions for his family and he was overcome on his return. A searching party found him. Mrs. Beckwith remained and she gained a livelihood by ferrying people across the river with a canoe.

Matthew Hubbard, of Trenton, N. Y., started for Ashtabula in 1804 as agent for his uncle, Nehemiah Hubbard. He left his home May 21, 1804, on horseback. He and his party reached the future port of Ashtabula, June 2, 1804. He found Mrs. Beckwith and her two daughters and a Mr. Thompson and his wife. They were the only settlers between Con-

neaut and the west line of Harpersfield, a distance of thirty miles. June 3, he selected a farm site and decided where he would build his cabin.

An old history of Ashtabula says George Beckwith built on lot 4, fractional town 13, range 3. Hubbard and Pierce erected a cabin in June, 1804. Pierce accompanied Hubbard on his trip from New York. A third cabin followed Hubbard's the same month. Samuel Beckwith arrived later and erected another cabin, but he left again and Hubbard and Pierce were then monarchs of all they surveyed, the solitary red men being their only companions. They had between them a yoke of oxen, a cow and mush pot, some flour and corn meal, and a few rude utensils.

As far back as 1812, log cabins were the rule in and about Ashtabula and the harbor. In 1837, some effort had been made to improve conditions and the town became known as a place to trade. The merchants at that time were forwarding goods to Detroit, Chicago and Lake Michigan ports. Mart Watrous, grand uncle of C. H. Watrous, superintendent of the harbor postoffice, was one of the forwarding agents in those early times. The business done then was considerable.

From 1837 to 1861, Ashtabula continued her prosperity. Three railroads were projected but the Cleveland, Painesville & Ashtabula, what is now the Lake Shore, was the only one constructed. Efforts had been unsuccessfully made to build a road to the Ohio, but the project fell through for lack of capital. In 1870, the Pittsburg, Youngstown and Ashtabula road was chartered as the Ashtabula, Youngstown & Pittsburg and trains were running on it in '73. The Lake Shore trains were running in '52, but did not reach the harbor till '73.

United States mail was brought into Ashtabula over the Ridge road from 1808 to 1852. This road was first cut out by Conneaut, Harpersfield and Ashtabula citizens. John Metcalf, the first mail carrier, had such a wild and unsettled territory to cover, he was often obliged to sleep in the woods or in the Indian wigwams when night overtook him. The road from Ashtabula through Saybrook, Austinburg and other townships was the principal route south. The mail was later transported in stages over this same road, known in 1819, as the Trumbull and Ashtabula turnpike. Gideon Leet, Matthew Hubbard, N. Hubbard, John Booth, E. C. Root, Henry Harris and J. F. Sexton were the first postmasters.

John Metcalf, Wm. Whitman and Calvin Cole were the first carriers.

The harbor at Ashtabula has grown big from a small beginning. In 1824, an act was passed by the Ohio general assembly incorporating the Ashtabula Harbor Co. In 1826, congress appropriated \$12,000 to remove ob-

across from the old "yellow warehouse," and the second was a pontoon bridge. John Thayer, who lives on Thayer's hill, tended this for several years. It stood where the swing bridge now is. It had a 58-foot draw. Later it was widened to 102 feet. The present bridge, erected in

their appearance, there were docks above the bridge and such boats as the R. J. Hackett, Forest City, Barnum, Havana and Sparta made regular trips to Ashtabula. They were light-draught, however, compared to the present freighters, which require at least 19 feet. One thousand-ton boats were big in '73 and 10,000-ton boats are not the largest now.

Ashtabula leads as an ore-receiving port, but she had a later start than other ports. It was not till '73 that ore-receiving was begun. T. H. Daly relates that June 25, 1873, the schooner C. H. Walker was loaded with coal. He and a gang of men were imported from Erie to do the loading. It was wheeled on at the P. Y. & A.'s old No. 1 dock. The first ore was taken off at the same dock July 11 and 12, 1873, from the schooner Emma Maize. She came in July 10. Wheelbarrows were used for the first and Lockport machines for the second operation.

Up to 1875, the total amount of money appropriated for harbor improvements was \$261,497.71. In that year, the west pier was extended 300 feet and a clear depth of 16 feet was obtained. Dredging had become an art then, however, for Capt. Dan Mitchell says the government used to have a scow drill that worked by horsepower in the same way that a pile driver works. The advent of the railroad changed the whole course of events. The total amount expended by the government for all purposes up to June, 1905, has been \$1,004,818.90.

Last year, the port received 6,401,740



LIFE SAVERS AT ASHTABULA.

Capt. Charles Anderson, standing; Gust Peterson at left; William Fields, Irwin Hinman, Earl Delavan, Francis Mallette, Earl Whelpley and Delancy Poole.

structions, Colonel Matthew Hubbard being appointed superintendent. The east pier was commenced in that year. In 1827, two parallel piers, 214 feet long, were constructed, down to a 10-foot depth. These were afterwards extended to 960 feet. In 1833, the piers went out 1,284 feet in the lake, making a 145-foot channel.

In 1834, 13,000 tons of the underlying shale rock were removed so the channel could be made nine feet deep. In 1836, the lighthouse was put up. It was an affair with seven lamps, which burned sperm oil. Before that a lantern was hung on a post at the end of the east pier, where the Ashtabula Dock Co.'s car dump now is. In 1876, the lighthouse was removed to the west pier. June 1, 1905, it was removed to the 50-foot square concrete pedestal at the new harbor entrance. Among some of the keepers, were Capt. Bigelow, Capt. S. C. Thayer, Seth Belknap, J. H. Oakley and the late P. H. Cheney. Capt. J. F. Crawford and F. J. Hartley, his assistant now keep it. It is what is known as a fourth order fixed red light with first class siren fog signal.

In the early days of Ashtabula, boats landed at the outer piers. The first bridge was a plank affair running

1889, has a 106½-foot draw. C. L. Scoville, an old resident and an old marine engineer, has tended it since its erection.

When boats first traded to Ashtabula, it was necessary to "scow"



ASHTABULA GENERAL HOSPITAL WHERE MARINE PATIENTS ARE CARED FOR.

freight to them out in the lake after they took on a certain amount. Capt. Dan Mitchell and Capt. James Calloway delight in telling about this. The former first shipped as mate on the old John Quincy Adams, an old time schooner. When steamboats made

tons of ore and 2,051,172 tons of coal were shipped. This year the increase in ore is already near the half million mark. In 1873, the P. Y. & A. docks received 15,027 tons of ore and the Lake Shore docks handled 1,180 tons in either '75 or '76. The records of

the Lake Shore were destroyed by fire and it is impossible to settle which year it was. Twenty years ago the total coal shipments were 201,048.

LAUNCHES IN THE HARBOR.

One of the most important features of the marine business at Ashtabula harbor is the launch trade. Each of the

McKINNON IRON WORKS.

Destroyed by one of the most disastrous fires which have visited Ashtabula in many years, the McKinnon Iron Works is to be rebuilt on a scale more pretentious than ever before. Larger buildings are to be erected, and they will be ornamental as well as useful, so their erection will



LAUNCHES OF THE SUPPLY HOUSES IN THE RIVER, 1906.

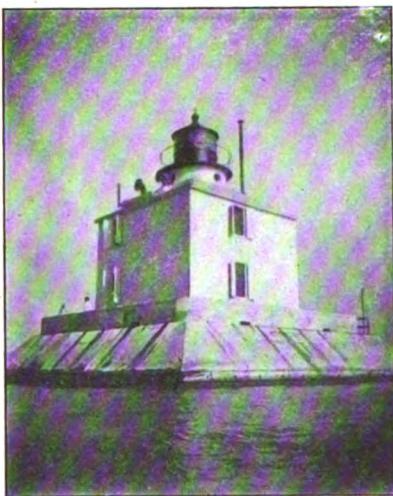
marine merchants have either one or two launches to deliver ship chandlery and supplies aboard the boats. In the accompanying picture, are launches owned by the following: Topky Brothers, McKinnon Iron Works, E. S. Miller, P. H. Cheney

improve the appearance of the east side of the harbor.

The machine shop is to be 50 x 100 and will extend nearly to the river from an 18-ft. alleyway in the rear of the new blacksmith shop, running east and west. It will be a steel frame affair and will have a track and traveling crane running its entire length and out to the dock.

The blacksmith shop will face on Columbus street. It will be a one-story brick structure 45 x 100, with a slate roof. It will be erected on the ground where the old one stood. The oil house, built entirely of concrete is to abut on the river and will be put up just north of where the old one stood. It will be 25 x 75.

The office and supply house, a two-story brick building, is to have a 30-ft. frontage on Bridge street and 100 ft. on Columbus. It will be built on the street level and it is expected will be ready in a month. The other buildings will be completed by the first of the year.



THE NEW LIGHTHOUSE AT ASHTABULA.
Courtesy Mrs. F. D. Brown.

Sons, H. S. Williams, G. F. Sheldon, T. J. Rennick, E. H. Burrill and the Gillen Dock Dredging & Construction Co. These launches are busy from morning till night. They transport thousands of dollars of merchandise every season.

some of Lake Erie's trimmest schooners took their initial dip in years gone by at Ashtabula.

The Tempest, built in 1814 by B. A. Naper, was undoubtedly the first schooner launched at Ashtabula. She was afterwards wrecked and, according to town history, there were strange fatalities connected with boats built after she was. Men were drowned when the boats were launched or the schooners were wrecked. The schooners General Jackson, Superior, Elisha Whittlesey and Parrot and the steamer Washington were all pursued by a hoodoo.

The Whittlesey, which was sunk with two of her crew and six passengers, was afterwards rebuilt in 1834. The Parrot, which was chartered by Wm. Humprey to transport hogs to Detroit, went down with all on board. The steamer Washington, an old-time side-wheeler was burned on her maiden trip east with the loss of sixty lives. The schooner Superior blotted out several lives by capsizing when she was launched.

A. Harmon, J. D. Hulbert, Henry Hubbard and Capt. G. A. Thayer were all directly connected with ship building on the lakes. One of Harmon's crack boats was the schooner Atlas, built in 1834. Hulbert and Hubbard rebuilt the James Willis, sunk near Geneva, and they owned the Oneida, Plow Boy, Snow Drop, Jessie and Boston. All were managed by Capt. G. A. Thayer.

The following is a list of boats built at Ashtabula: Tempest, 1814; Elizabeth, 1815; General Jackson, 1816; Eagle, 1818; Superior, 1818; Traveler, 1819; Columbus, 1826; Telegraph, 1828; Elisha Whittlesey, 1829; Nehemiah Hubbard, 1831; Warren, 1833; Parrot, 1833; Atlas, 1834; G. S. Willis, 1834; steamer Washington, 1837; schooner Adelaide, 1838; Windham, 1842; sloop Emma, 1844. Between the years 1844 and 1868, were built the schooners Bennington, Cadet, Porter, Dahlia, Signal, Chief Justice Marshall, Pilot, Constellation, Olean-der, Joshua R. Giddings, Chicago, Ashtabula, Adriatic, Sioux, Gray, B. F. Wade, New Lisbon, Arctic, Oneida, Mary Collins, Boston Plow Boy, Jessie, Snow Drop, Julia Willard, Wind and Wave, Edwin Harmon, Mosher, Vampire Mermaid, Perry White and the tug McLellan.

J. G. Laird & Son's and H. J. Devney's ship yards, which are modest reminders of former busy days, are located north of the bridge on opposite sides of the river.

ASHTABULA'S SHIP BUILDING IN EARLIER DAYS.

Ashtabula has been famous in earlier times as a ship building port, and it seems to have been only for reasons beyond her control that this prominence was not continued. However,

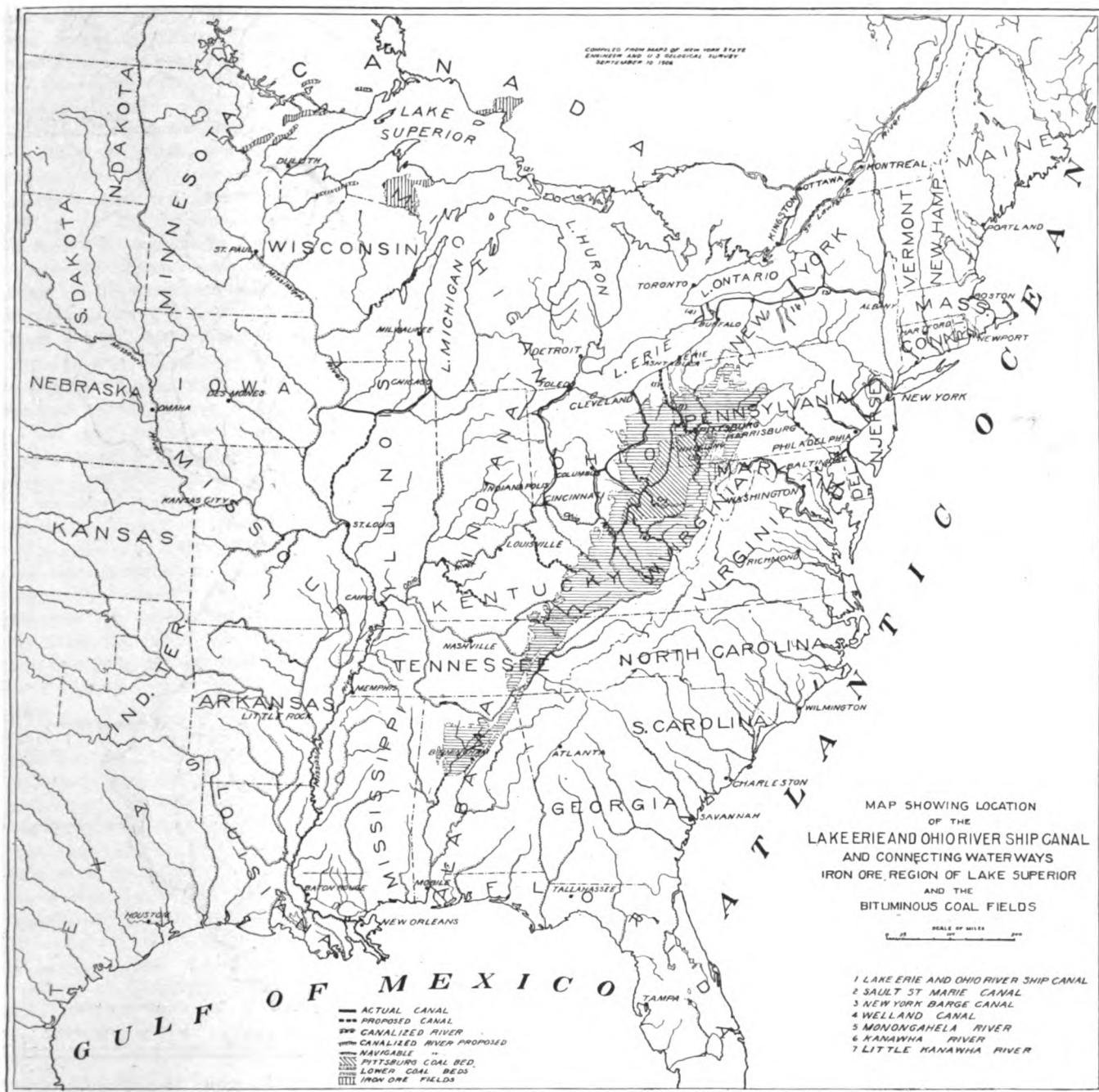
LAKE ERIE AND OHIO RIVER SHIP CANAL FROM ASHTABULA TO PITTSBURG.

This important work has now reached the point where preparations for construction should come about in a very short time. From Mr. George M. Lehman, chief engineer for the

ship canal company to be organized and to operate over the route as indicated on the accompanying map. The committee realizing the national importance of the canal project, had a

cured in Pennsylvania, and later one in Ohio.

The national charter, after some years of effort, was passed in a most satisfactory manner by the house



canal company, the following information is given:

"The canal project has advanced by stages until it is now on the verge of a reality. About ten years ago, under the auspices of a committee of the Chamber of Commerce, of Pittsburgh, surveys and estimates were made and laws passed both in Pennsylvania and Ohio, authorizing a

bill introduced in Congress which would authorize the building and operating of a canal, between Pittsburg and a point at or near Ashtabula, Ohio.

In the forepart of last year, due largely to progressive measures taken by the Merchants and Manufacturers' Association, of Pittsburg, a company was organized and a state charter se-

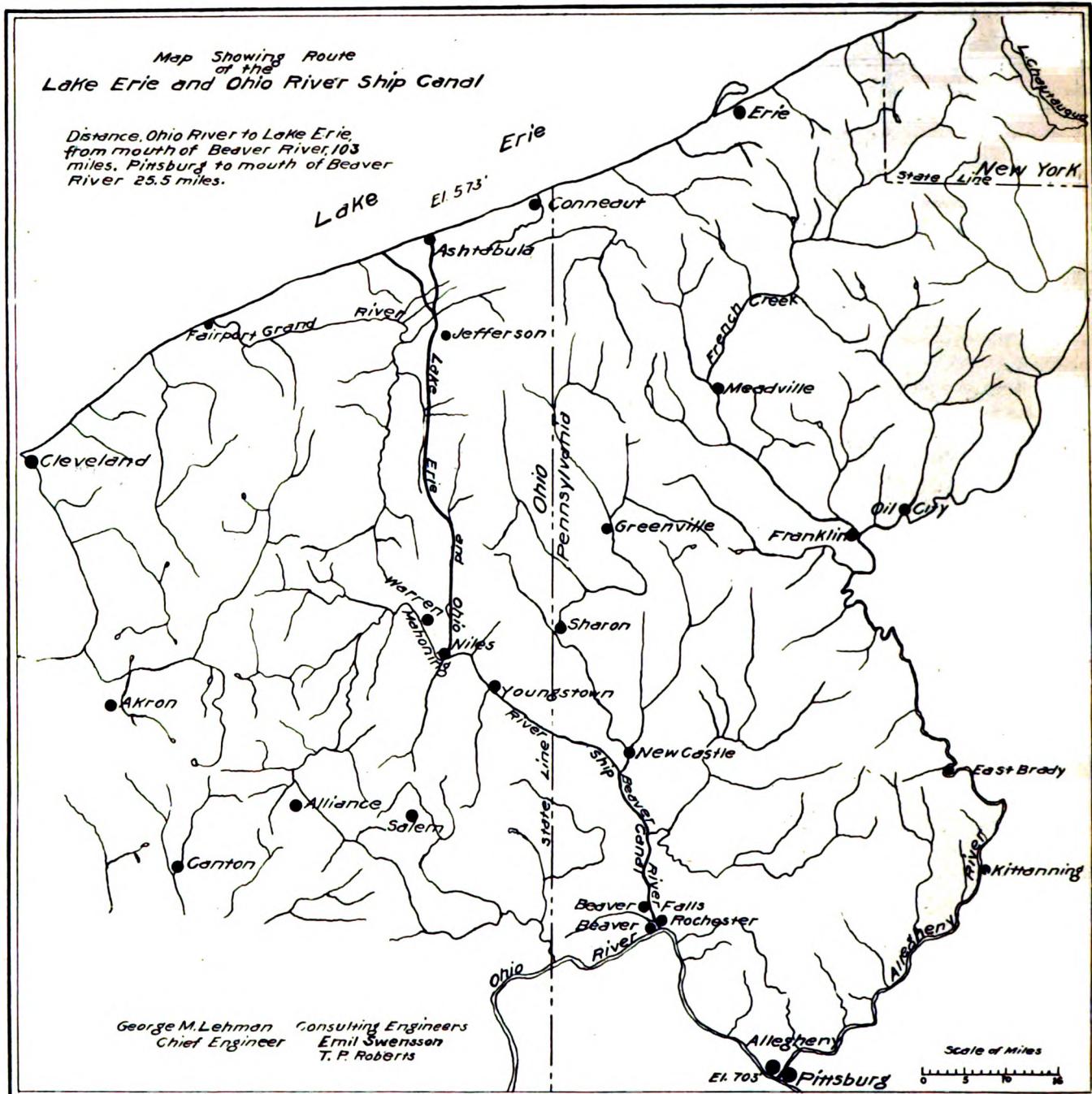
and senate at the last session of congress. Mr. John E. Shaw, president of the canal company, in addressing the committee, brought forth with such convincing facts the immeasurable benefits to be derived by the general public by the construction of this great waterway, that the eyes of the members of the respective committees, coming from

various parts of the United States, were opened to the national importance of the project and favorable reports resulted—but not before every feature of the bill had been investigated and certain amendments made. Much discussion followed the introduction of the bill in the senate, but

with its large industrial centers, connected with Pittsburg and the Ohio river, by a waterway—thereby accomplishing at one stroke, by a ditch about 50 miles long, and 50 miles of canalized river, the union of the greatest tonnage producing inland waters to be found anywhere upon

communication between a countless number of cities, and the whole making possible a more rapid growth to many communities now lying dormant.

The Erie canal, through the heart of New York state, will give connection with New York City, the Well-



it finally passed with an overwhelming majority.

Congress having heretofore ignored, or acted with indifference, became intensely interested and really observed for the first time, after reviewing engineering and commercial reports bearing upon the subject, what it means to producer and consumer of a large part of this country by having the great lakes,

the face of the globe, by the cheapest form of transportation known to mankind. The notable result is the bringing together of the vast iron ore fields of Lake Superior, with the matchless coal deposits of the Pittsburg district, which is at the same time the iron and steel center of the world, with 5,000 workshops. Building materials of various forms will likewise be brought into cheaper

and canal with the St. Lawrence river canals, and the Mississippi river with New Orleans and the Gulf, and finally by Panama a canal to the Pacific coast.

Mr. John Dalzell, who presented the bill in the house of representatives, aptly remarked, "If you will glance a moment at that portion of the map which embraces the great lakes, the sources

of the Ohio, and the territory adjacent to both, you will see two regions of magnificent natural wealth, the one the complement of the other, but separated by a space not great in fact, but great enough to strip either region of the value for which it is dependent upon its partnership with the other." "If now you will place the Superior ore fields alongside of the Pittsburg coal fields you will have the factors of an industrial sovereignty that will challenge the world to produce its equal."

When the canal bill reached President Roosevelt he took special pains to look into the merits of the project—its commercial importance, not only to the belt of country through which it will run, but to the country at large and the personnel of the promoters. The examination being satisfactory the bill was promptly signed and has become a law.

As a matter of history, it may be interesting to note, from Bauseman's "History of the Beaver Valley," that as early as the year 1755, Lewis Evans, a pioneer of the upper Ohio valley, remarked that the Beaver river and its branches offered facilities for opening a canal from the Ohio river to Lake Erie, and that this would be done some time in the "Future Ages." George Washington, in 1788, also spoke of the advisability of connecting Lake Erie with the Ohio river by way of the Beaver and thence to the Cuyahoga river. He questioned, however, if there might not be a more direct route of communication than by the latter route. In 1833, the first division of a canal, of small draft, was completed and afterward extended to Lake Erie at Erie, Pa. This canal passed over a summit of 1,082 feet above tide, had 133 locks, and a total lift of 936 feet. In 1872 the old canal property was sold and its bed partly occupied by a railroad.

The provisional committee of the Chamber of Commerce, of Pittsburg, had extensive surveys made which demonstrated beyond doubt the feasibility of the canal from an engineering standpoint, and the commercial advantages. The following gentlemen composed the board of consulting engineers: General Henry L. Abbott, at the time just retired from the engineer corps of the army, and recently a member of the advisory board of the Panama canal, and an authority both in this country and abroad upon canal matters and works pertaining thereto; Prof. Lewis M. Haupt, who was a member of the Nicaragua Canal Commission, and Mr. N. H. Hutton, of the harbor

board of Baltimore. The consulting engineers, now acting, are Mr. Emil Swensson, member American Society of Civil Engineers and Mr. T. P. Roberts, both of Pittsburg.

The project at this time proposed a canal, 15 feet deep, direct from the harbor of Pittsburg, paralleling the Ohio river for a distance of about 25 miles, and entering the Beaver river above its junction with the Ohio, making the entire distance to the lake, 128 miles.

The government slackwater improvement of the Ohio river, from Pittsburg to the mouth of the Beaver, with a fall of 35 feet, is now about completed, and will give a depth of nine feet, but it is known that this can be readily increased to 12 feet, and that it would unquestionably be done, immediately upon or before the completion of the Lake Erie and Ohio river ship canal.

The canal company, during last year, had a location survey made upon which it can build. These surveys verified the work done in 1895, have furnished additional information, and made sure that the project is free from insurmountable obstacles. It has come to be known that there is no route of practical value, outside of the belt of country through which the one in question extends, for a ship canal connecting the upper Ohio river and Lake Erie. This route, beginning at the Ohio from the government slackwater, will ascend the Beaver, and thence the Mahoning to the vicinity of Niles, Ohio, and thence in almost an air line to Lake Erie; entering the lake at or near Ashtabula

By reference to the map it may be seen that New Castle is close to the main canal, and will be reached by a short branch, by canalization of the Shenango river, and by this means Sharon can be connected by an extension of about 20 miles length. Youngstown is directly on the line of canal. This whole district is prominent in the manufacture of steel.

The total lockage will not exceed 560 feet, and may be only 479 feet, with 24 lifts, up and down. In the latter case the summit elevation will not be greater than 860 feet above tide, 287 feet above Lake Erie, and 157 feet above the harbor of Pittsburg.

Modern canal engineering, recognizing the superiority of wide channels, it is proposed to have a minimum bottom width of 130 feet, with a depth over lock sills of not less than 13 feet, and probably 15 feet to correspond to the New York state canals and those of Canada. The

width will be 22 feet greater than the recently enlarged Suez canal. It is not to be understood, by any means, that all of the engineering problems will be of simple character, but it may be said, from a physical standpoint, that to connect Pittsburg and the Ohio river with Lake Erie, nature favors the project and could have made little improvement had she specially placed the Beaver and Mahoning rivers for the purpose, and this is also true, to a large extent, for the country beyond. The natural elements necessary for the project have been assembled in great harmony—it remains for man to make the proper use of them.

A question of great importance to a canal is the water supply; to be conservative the sufficiency of this to meet the demands of an annual business of 25,000,000 tons has been fully established, and for an increased tonnage additional storage reservoirs and feeders can be readily provided. While a large portion of the supply can be direct, it is the purpose to serve to the summit largely from storage water, the water being collected during periods of high water, and brought from streams within easy reach. The rivers will be largely benefited by having returned to them, an enormous quantity of water, during the canal season, a part of which time the streams now frequently suffer from the want of it.

As the prospectus for preliminary financing has not been completed it would be out of place to go further into details in describing the project at this time. It is finally the purpose to prepare a full description of all important engineering and commercial features.

Capt. Edward D. Gatfield, who has been mate of the Shenango Steamship Co.'s new steamer William P. Snyder since she came out in the spring, took command of her at Ashland on Tuesday. Capt. Henry Peterson, who brought out the Snyder, leaves her to superintend the construction of the new boat ordered by William P. Snyder, of Pittsburg. Capt. Gatfield is a son of Capt. William Gatfield, of Amherstburg, Ont., and he has a host of friends who wish him well in his new position.

Capt. James Doner, master of the steamer William Livingstone, made his initial appearance at Ashtabula this week, unloading at Superior No. 4 dock. Capt. Doner is well known in Ashtabula, and his friends were glad to see him.



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SEPTEMBER 20, 1906.

FREE FOR ALL CONTEST.

The MARINE REVIEW is requested by the officers of the Merchant Marine League of the United States to state that every essay received in its prize contest will receive fair and just treatment. Some newspapers, unquestionably hostile to American shipping development, are seeking to create the impression that the league will not deal fairly with essays that favor the free trade, free ship or some other anti-protection, anti-government aid, policy. Nothing can be said that is more unjust or unfair.

It is the purpose of the league officers to deal with all essays strictly upon their merits, and merit alone will be the basis of the award. Where contestants ask for information, the league refers them to the Tariff Reform Committee of the Reform Club,

of New York, a free trade organization that for years has been carrying on an active propaganda against all measures seeking to build up our shipping with the aid of the government. In addition, contestants are informed that speeches were made in the last congress against the shipping bill, which passed the senate on Feb. 14, by Senator S. R. Mallory, of Pensacola, Florida, and by Representatives William Sulzer and Joseph A. Goulden, of New York, and by Representative George G. Gilbert, of Shelbyville, Kentucky.

The league goes still further and advises contestants who ask for information to ask their representatives in congress to procure for them copies of the report of the U. S. Commissioner of Navigation, and the bibliography issued by the librarian of congress, which latter catalogs everything extant on the shipping question, whether for or against government aid. With this information in his possession, and with the reports of the Congressional Merchant Marine Commission, the reports of the Senate Commerce Committee and the House Merchant Marine and Fisheries Committee, the speeches made by Senators Frey, Gallinger and Lodge, and the speech by Representative Grosvenor, in favor of that bill which passed the senate in February, and which reports and speeches cover the question from the protectionist view very thoroughly, no student, ambitious of winning fame, honor and a substantial sum of money, need hesitate to become a contestant for one of the prizes.

HOW GOMPERS HELPED.

When President Samuel Gompers, of the American Federation of Labor, invaded the second Maine congressional district, for the purpose of defeating Representative Charles E. Littlefield for re-election, he opposed the latter on three counts, viz: 1. The anti-injunction bill. 2. The Merchant Marine Commission's shipping bill. 3. The anti-compulsory pilotage bill. A large number of Mr. Littlefield's constituents, democrats and republicans

alike, as vessel owners and as vessel builders, are deeply interested in, and will be vastly benefited by, the enactment of those two bills. So, the more President Gompers showed up Congressman Littlefield as making a strenuous fight for the shipping bill and the anti-compulsory pilotage bill, the more he helped to elect the man he was seeking to defeat. Mr. Littlefield won triumphantly, and Mr. Gompers, and his score of aides, retired from the contest very much ruffled.

It is true that Mr. Littlefield won by a greatly reduced majority, as compared with the majority he received two years ago. But, as compared with the other Maine republican candidates for re-election to congress, the reduction in the majority in Mr. Littlefield's district was not so large as in some of theirs. Moreover, he ran ahead of his ticket, especially in the cities where President Gompers and his aides had been most active.

There is probably no district in the United States where a larger number of voters are so directly interested in favorable shipping legislation as in the second Maine. That many democrats were able to, and did, show their contempt for President Gompers, and his charges against Representative Littlefield, by voting for the latter, is an evidence both of their good sense and their patriotism. Mr. Littlefield will resume his activity, at the coming short session of congress, in behalf of the shipping bill and the anti-compulsory pilotage bill, with renewed zest, and all signs indicate that he will succeed, to the discomfiture of Mr. Gompers and those secret enemies of American shipping who are backing him in his fight against those who favor those bills.

QUESTIONS FOR MASTERS AND MATES.—NO. 10.

146. What is meant by the portative force of a magnet?
147. Two magnets of equal size, such as two adjusting magnets, how could you put them together so as to destroy or neutralize their magnetism?
148. What is an isogonic line?
149. What is the difference between an isogonic line and a line of equal variation?
150. What is an agonic line?

151. Is there an agonic line passing through the lake region?

152. How does a compass point on this agonic line?

153. Does a magnet lose any of its force by being incased in brass or copper, such as adjusting magnets?

154. What effect has a brass or copper casing as to the portative force of a magnet?

155. What is meant by attraction across bodies?

156. Will attraction assert itself through wood, brass, glass, etc.?

157. Is it possible to intercept magnetism by placing wood, brass and like substances, between the compass and the iron or steel creating the disturbing force?

158. Does a magnet covered with wood have the same amount of magnetic force it would were it not covered with wood?

159. What are magnetic charts?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.—NO. 11.

Questions 94 and 97 in the wheelsmen's and watchmen's contest are republished in somewhat different form for the purpose of added clearness. Question 94 should read as follows:

94. What good mark is there to bring stern of boat on from Sandwich Point to abreast Woodward avenue, Detroit?

Question 97 should read as follows:

97. When bound up Detroit river steering on Windmill Point ranges, what turning mark have you when hauling for entrance to Grosse Point cut? What would you head your vessel on, and what landmark would you have the stern of boat on?

112. What ranges should you run on going from Southeast bend to Star Island House?

113. After leaving lower end of Grosse Pt. channel what marks would you head on and what mark would you have the stern of boat on?

114. What mark would you have to make a slow turn to have stern of boat on Windmill Point ranges?

115. When desiring to round to bound down at Detroit at night and can't see spar buoy at lower end of Belle Isle, what marks have you to know when you are abreast of it?

116. As it is often smoky passing down from Belle Isle to Sandwich Pt., tell us if you have any mark to head on and what it is?

117. When abreast Smith's coal dock what ranges would you use and which way would you keep them open?

118. Name in proper order what ranges you head on and what ranges you put stern of steamer on from Smith's coal dock to lower end of Bois Blanc Island.

119. When wanting to know when to starboard slowly so as to bring stern of steamer on South Grosse Isle channel ranges, tell if you have any mark and what it is.

120. Which way will the current carry you from South Grosse Isle channel ranges to upper end of Ballard's reef channel?

121. If bound down what whistle side would you take of steamer bound up?

QUESTIONS FOR OILERS AND WATERTENDERS.—NO. 7.

61. What temperature should you carry the feed water in a jet condenser?

62. Why is not a greater vacuum than 25 or 26 inches carried?

63. If you found your discharge pipe from air pump vibrating, or your pump thumping, what would you do?

64. How would you find the length of the eccentric rod with link motion?

65. Give the thickness of the various plates used in boiler manufacturing shell plates being one (1) inch thick.

66. If you had (2) two boilers of the same diameter, what would their relative pressures depend upon?

67. If one boiler was 12 ft. in diameter and the other 4 ft., which would stand the greatest pressure, and how much?

68. If the glass water gauge is fitted on a mounting connected by two pipes, one to the dome and one to water space, what would you do on observing (1st) that the glass was empty, and (2d) that the glass was full?

69. What is one of the most important duties of an engineer or oiler O. B. ship?

70. In assisting to set a valve you had $\frac{1}{8}$ in. top lead and $\frac{5}{8}$ in. on the bottom, you wanted 5-16 in. on top and 9-16 in. on the bottom, what would you do?

FROM GRATIOT LIGHT TO SARNIA ELEVATOR.

A leading vessel owner has issued the following instructions to the masters of his fleet:

"In coming down from Fort Gratiot light until after you pass the elevator at Sarnia, we would advise that you proceed at about half speed until after passing the elevator. In our opinion this will give you a better chance to have your ship under control in case of an accident in the crowded channel."

The masters of this fleet have cordially indorsed the suggestion. This is a dangerous stretch of water to

navigate at full speed, and it has been suggested that half-speed should be a government regulation.

LAUNCHING THE W. E. FITZGERALD.

The steamer Wm. E. Fitzgerald, building for the Chicago Navigation Co., of which Capt. Dennis Sullivan is manager, was launched from the Wyandotte yard of the American Ship Building Co. on Saturday last. The Fitzgerald is one of the smallest vessels now building on the lakes, being 440 ft. over all, 420 ft. keel, 52 ft. beam and 28 ft. deep. Her engines are triple-expansion, with cylinders 22, 35 and 58 in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 13 ft. two inches by 12 ft., fitted with Ellis & Eaves draft and allowed 170 lbs. pressure. This steamer was named in honor of Mr. W. E. Fitzgerald, whose accidental death a couple of years ago was deplored along the whole chain of lakes. At the conclusion of the launch luncheon was served on board the steamer Pleasure. President Wm. Livingstone, of the Lake Carriers' Association, presided as toastmaster and informal remarks were made by a number of speakers. Those present were. From Chicago—Capt. D. Sullivan, Mrs. Sullivan, Miss Helen Sullivan, Paul Sullivan, Mr. and Mrs. George L. McCurdy, Miss Helen McCurdy, R. J. Dunham, Mr. Adams. From Milwaukee—Mrs. W. E. Fitzgerald, W. L. Fitzgerald, Master Edmund Fitzgerald, Mr. and Mrs. Frank W. Smith, Mr. and Mrs. Charles Neff, Mr. and Mrs. Blackburn, Gordon Blackburn, Miss Lucy Dore, Thomas Sheriffs, Capt. John Joys, A. M. Joys. From Cleveland—Mr. and Mrs. James C. Wallace, Robert Logan, Mr. and Mrs. Irving Latimer, W. G. Beck, Frank Masten, John R. Scott and Frank LaMarche. From Buffalo—Capt. J. J. H. Brown. From Detroit—Mr. and Mrs. M. E. Farr and daughter, William Livingstone, W. A. Livingstone, Rear Admiral Charles Cotton, Mr. and Mrs. A. A. Schantz, Mr. and Mrs. L. C. Waldo and daughter, Capt. J. W. Westcott, Frank Jeffrey, Mr. and Mrs. H. T. Morley, A. C. Angell, Mr. and Mrs. R. T. Gray, H. K. Oakes, Mr. and Mrs. E. L. Thompson, N. D. Carpenter, Joseph King, Dr. J. E. King, Capt. T. LeMay, Capt. George Bryce and others.

Capt. Alex Callam, of Amherstburg, will command the Fitzgerald, and Frank Keating will be her chief engineer.

NEW STEAMER FOR GOOD-RICH LINE.

The Goodrich Transit Co., of Chicago, has given contract to the Manitowoc Dry Dock Co., for the construction of a steel passenger steamer to be named Alabama. The new steamer, which is to be ready on July 1 next, is to be 250 ft. over all, 230 ft. keel, 40 ft. beam and 17 ft. deep. Intended for use during the entire year, the Alabama will be built of the heaviest material with a double thickness of plating at the bow for ice crushing. Around the ship at the water line there will also be an extra plating. The hull will be divided into eight watertight compartments and her engine power will be sufficient to drive her at the rate of sixteen miles an hour.

AROUND THE GREAT LAKES.

Capt. John Mitchell, of Cleveland, who has been abroad for two months, has returned.

W. H. Meyer, president and general manager of the Milwaukee Tug Boat line, died at Denver this week.

The Canadian steamer Rosemount,

which went on the rocks about twelve miles below the Detour lighthouse, has been raised.

The steamer Madagascar, lumber carrier, having been sold by Bigelow Bros., has gone to the coast. Her home port hereafter will be Boston.

A severe wind storm at Escanaba, blew down two giant coal hoisting towers, each weighing 400 tons, on the dock of the Reis Coal Co. last week.

The steamer H. B. Tuttle, with a cargo of coal, sprung a leak off Cedar Point, Lake Erie, last week, and sank half a mile off Marblehead light. The steamer is in no danger.

Land for docks has been purchased by the Wabash railroad on the north side of the Black river at Lorain, five miles from its mouth and a mile above the National Tube Co.'s docks.

Thomas C. Frame and W. C. McCreery, who have been employed by the United States engineers' office at Ashtabula, have left the government employ to work with the Pennsylvania under J. P. Fitzgerald, engineer-in-charge.

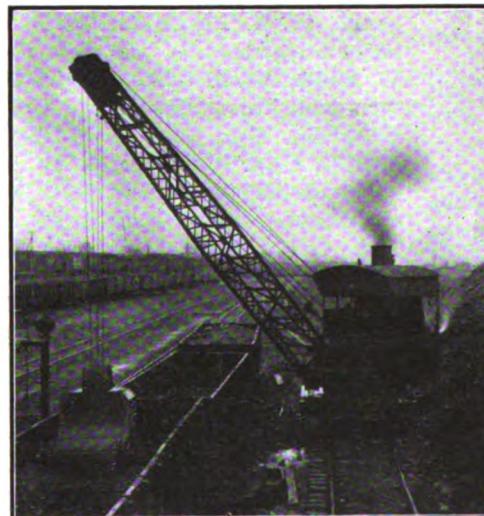
The steamer R. A. Seymour was picked up in a disabled condition fifteen miles off Frankfort, Mich., in a

heavy sea last week and taken to Sturgeon bay. The steamer had blown out her cylinder head.

Capt. E. D. Gatfield's promotion from a mate's berth to the command of the steamer William P. Snyder, has brought about the advancement of Otto Framer, who goes from a second to a first mate's berth. Harvey Bonnah will act as second mate. The Snyder made her first trip to Ashtabula this week, carrying 10,050 tons of ore to the Union dock.

The steamboat inspection service has issued a circular directing attention to the act regulating motor boats of fifteen gross tons or less which carry passengers for hire. The purpose of this act is to require the operators of these boats to take out licenses through the board of local inspectors, though no examination is required to obtain the license. The new regulations require that every person so licensed shall be over twenty-one years of age. A fine of \$500 is imposed for navigation of one of these craft without having such a licensed person in charge.

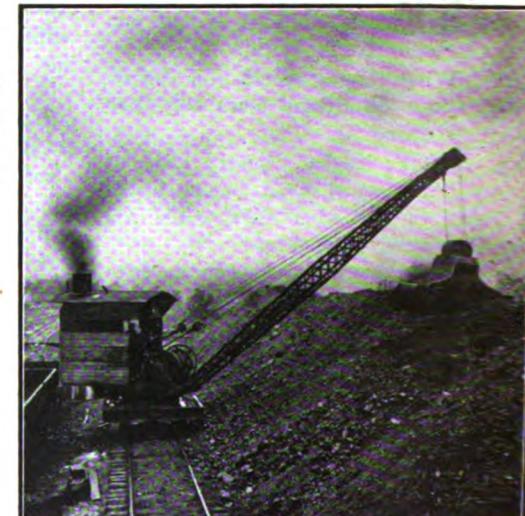
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VOL. XXXIV.

CLEVELAND, SEPTEMBER 20, 1906.

No. 12.

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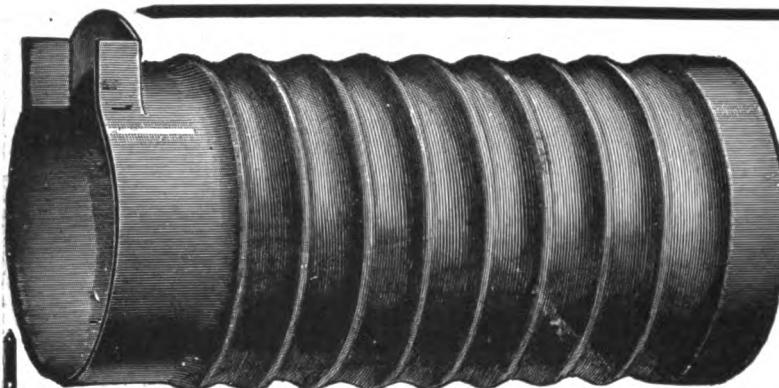
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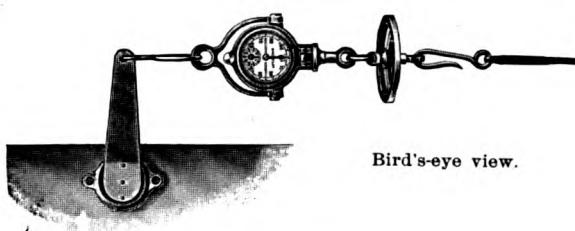
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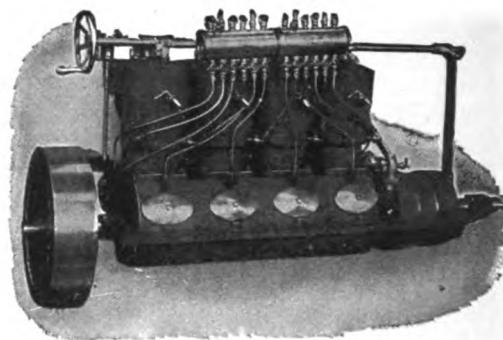
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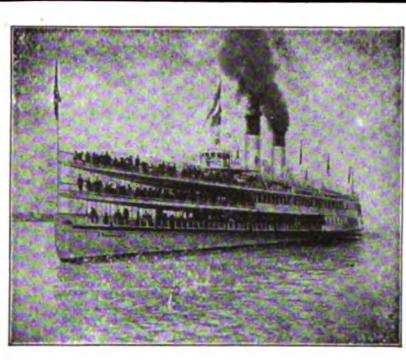
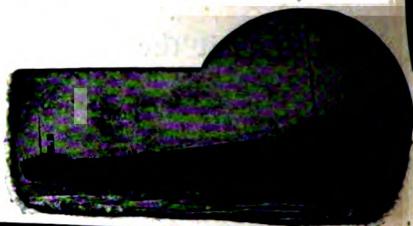
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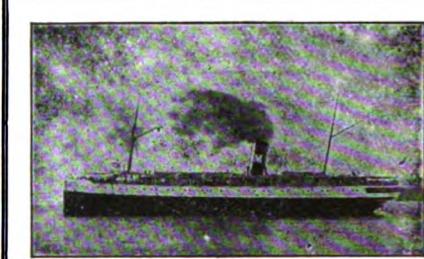
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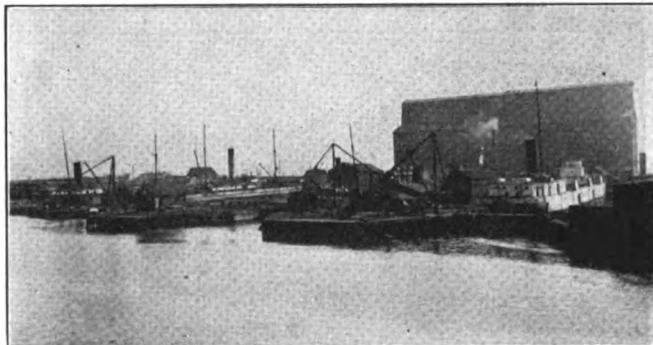
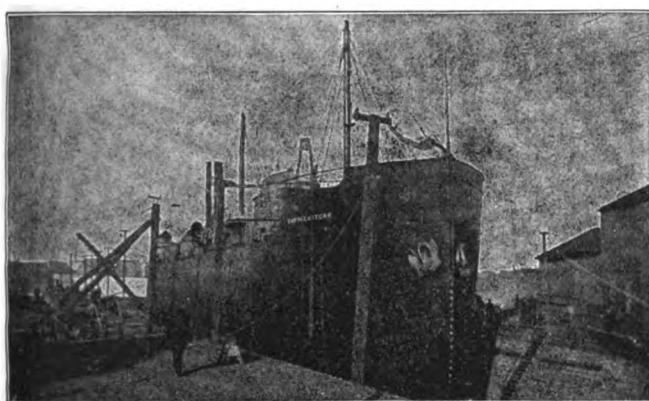
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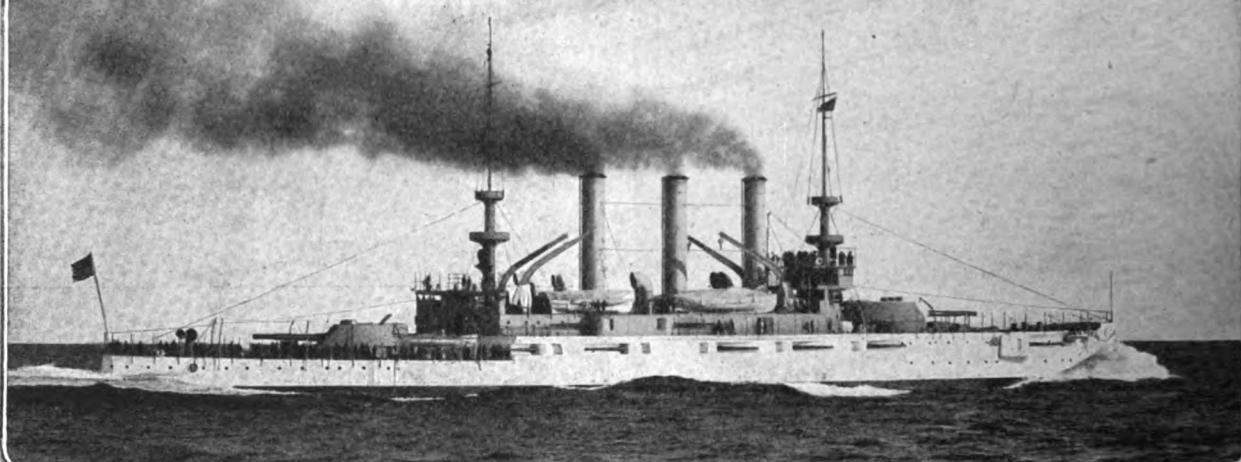
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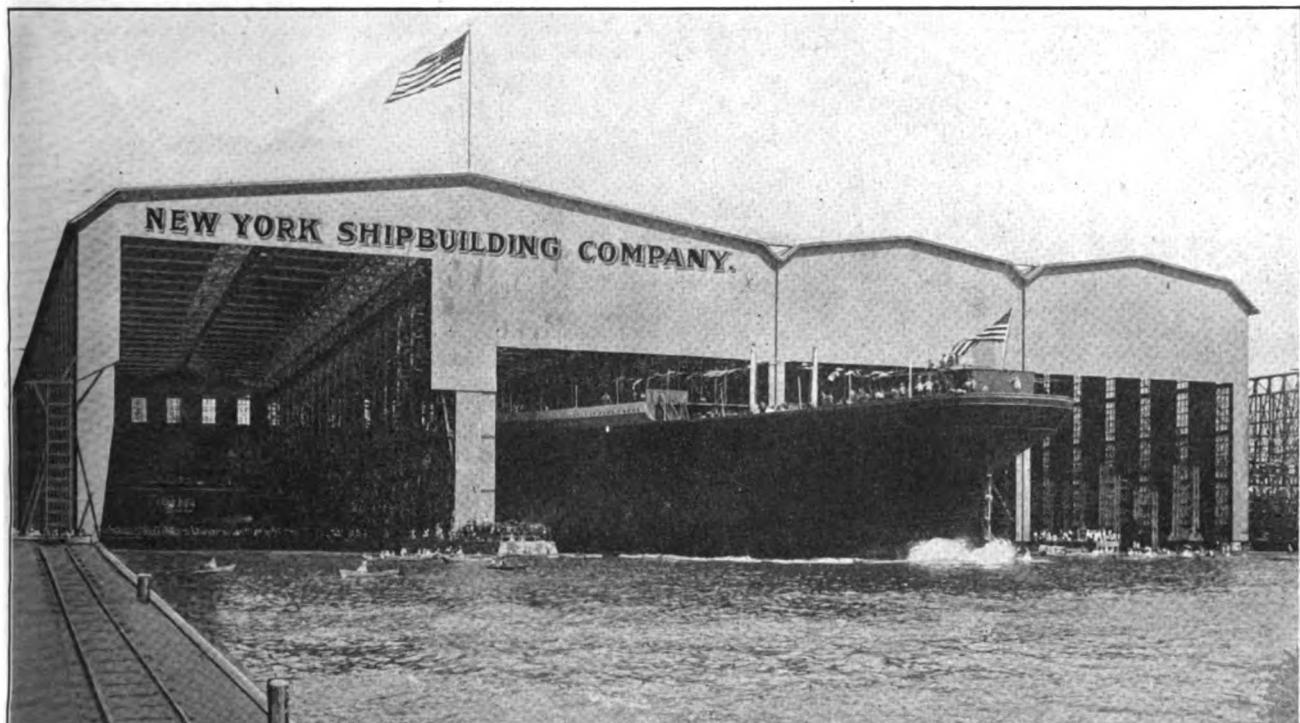
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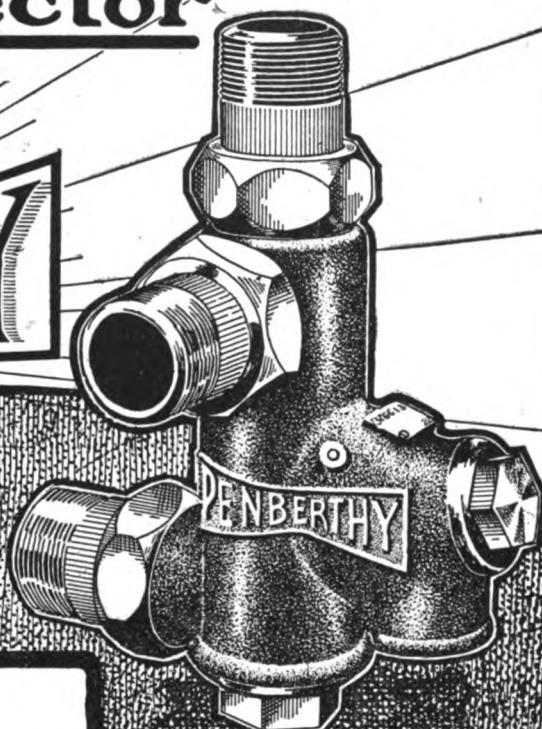
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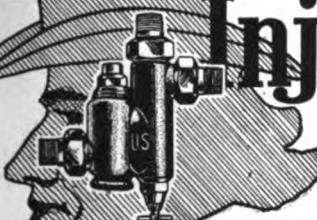
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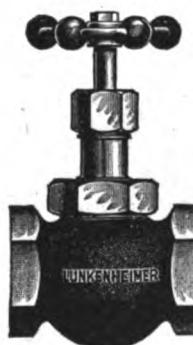
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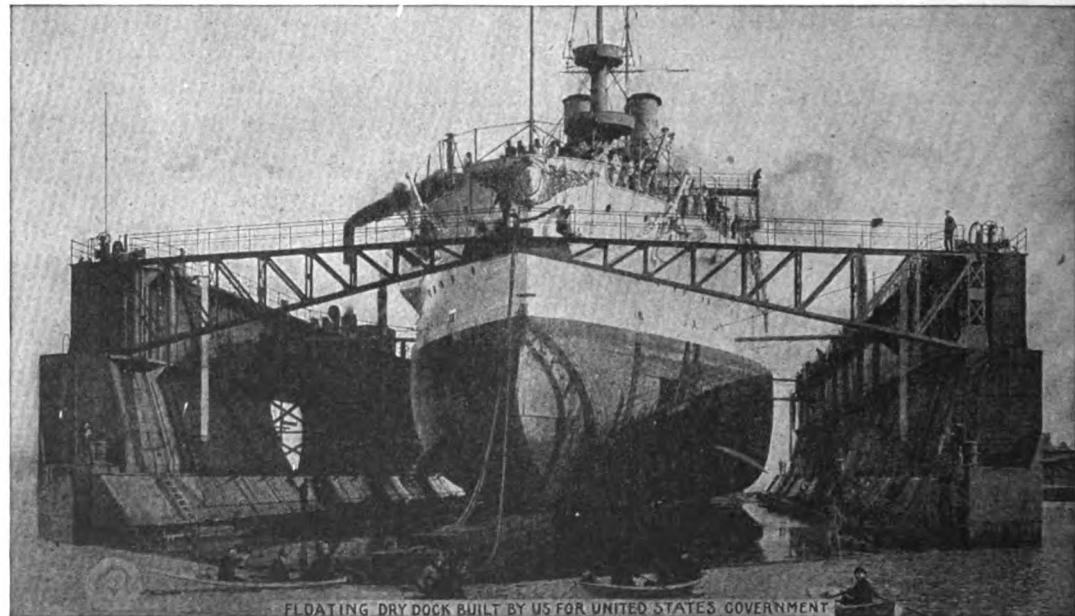
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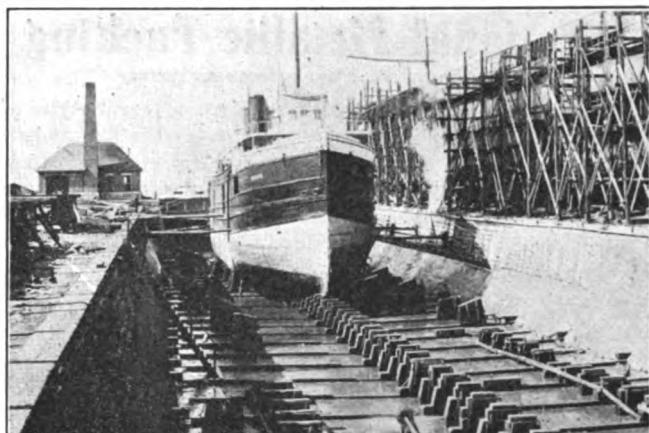
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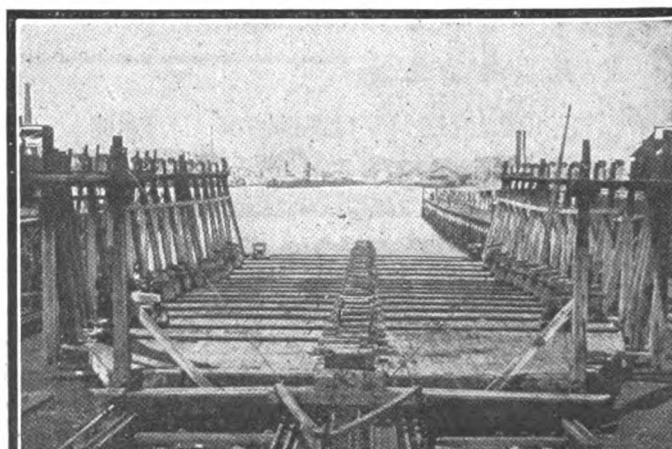
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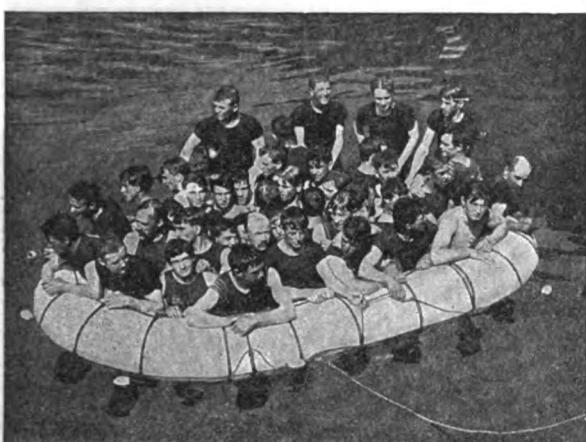
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Requires no davits or tackle.

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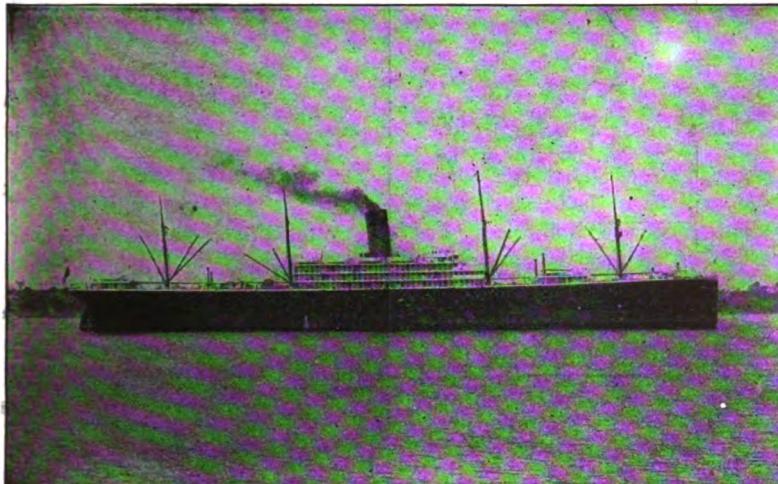
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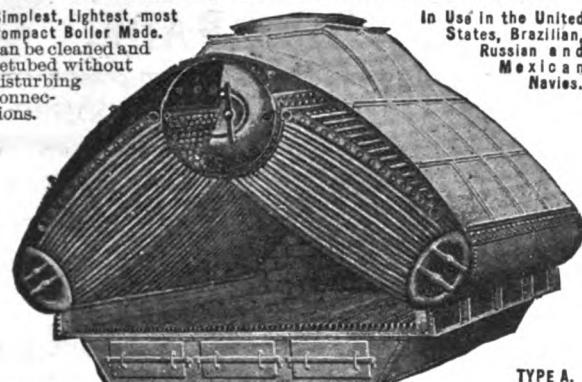
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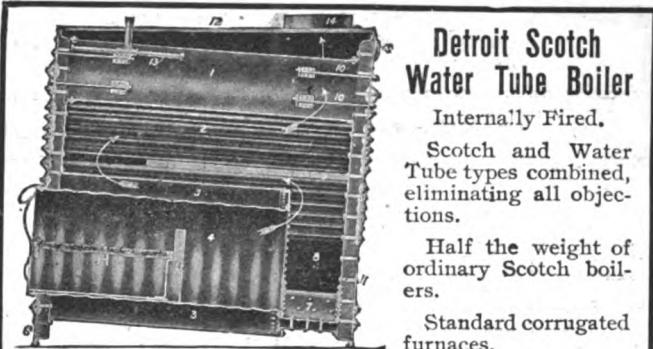
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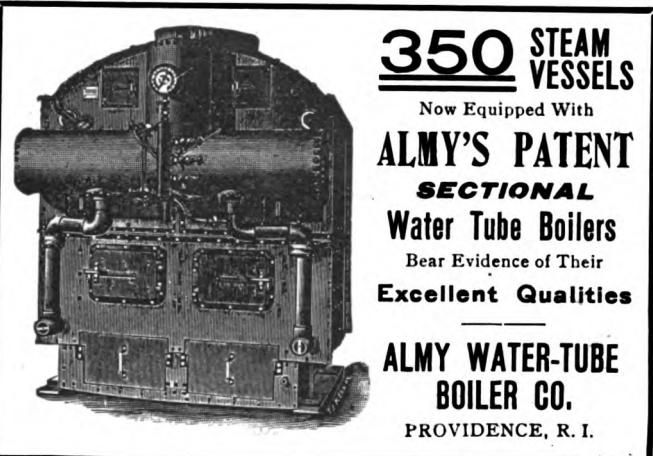
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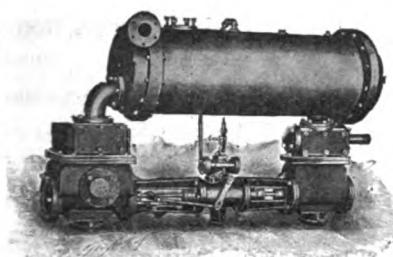
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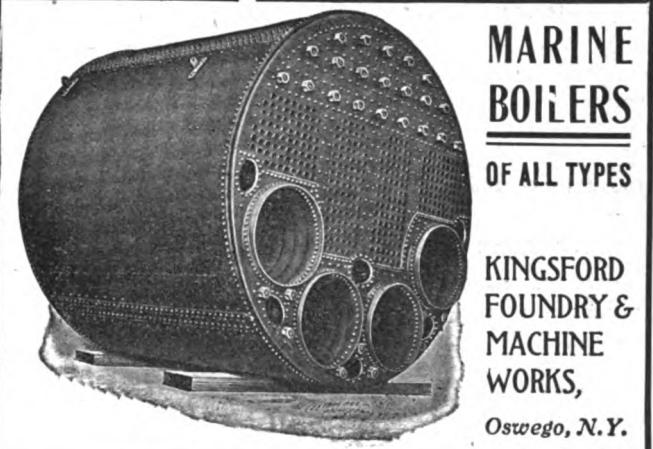
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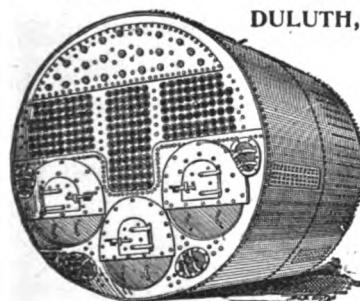
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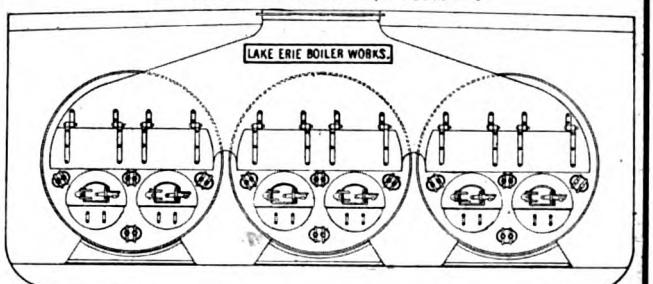
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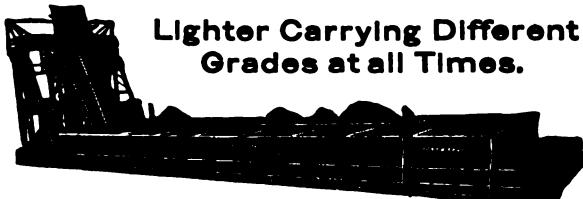
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**Submarine Work
of all kinds**

Dredging Hard Material a Specialty.

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Buyers' Directory of the Marine Trade.—Continued.

CORK JACKETS AND RINGS.
Armstrong Cork Co., Pittsburg, Pa.
Kahnweiler's Sons, D....New York

CRANES, TRAVELING.
Brown-Hoisting Machinery Co.....
..... Cleveland.

DIVING APPARATUS.
Morse, A. J. & Son.....Boston.
Schrader's Son, Inc., A..New York

DREDGING CONTRACTORS.
Breymann & Bros., G. H....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co....
..... Buffalo.
Great Lakes Dredge & Dock Co..
..... Chicago.
Hickler Bros. Sault Ste. Marie, Mich.
Hubbell Co., H. W..Saginaw, Mich.
Smith Co., L. P. & J. A..Cleveland.
Starke Dredge & Dock Co., C. H...
..... Milwaukee.
Sullivan, M. Buffalo.

DREDGING MACHINERY.
Quintard Iron Works Co. New York.

DRY DOCKS.
American Ship Building Co.....
..... Cleveland.
Atlantic Works ..East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....
..... Chicago.
Cramp, Wm. & Sons..Philadelphia.
Detroit Ship Building Co.....
..... Detroit.
Great Lakes Engineering Works....
..... Detroit.
Lockwood Mfg. Co.....
..... East Boston, Mass.
Milwaukee Dry Dock Co.....
..... Milwaukee.
Newport News Ship Building Co..
..... Newport News, Va.
Shipowners' Dry Dock Co.Chicago.
Superior Ship Building Co.....
..... Superior, Wis.
Tietjen & Lang Dry Dock Co....
..... Hoboken, N. J.
Toledo Ship Building Co.....Toledo.

DREDGE BUILDERS.
Manitowoc Dry Dock Co.....
..... Manitowoc, Wis.

DYNAMOS.
General Electric Co.....
..... Schenectady, N. Y.
Thropp & Sons, John E.....
..... Trenton, N. J.

ELECTRIC HOISTS AND CRANES.

General Electric Co.....
..... Schenectady, N. Y.

ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....
..... Schenectady, N. Y.
Thropp & Sons, John E.....
..... Trenton, N. J.

ENGINE BUILDERS, MARINE.
American Blower Co., Detroit, Mich.
American Ship Building Co.....
..... Cleveland.

Atlantic Works, East Boston, Mass.
Briggs, Marvin.....New York.
Chicago Ship Building Co., Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons, Philadelphia.
Detroit Ship Building Co., Detroit.
Fletcher, W. & A. Co., Hoboken, N. J.

ENGINE BUILDERS—Continued.
Fore River Shipbuilding Co.....
..... Quincy, Mass.
Great Lakes Engineering Works....
..... Detroit, Mich.
Hall Bros. Philadelphia.
Lockwood Mfg. Co.....
..... East Boston, Mass.
Maryland Steel Co.....
..... Sparrows Point, Md.
Milwaukee Dry Dock Co., Milwaukee.
Mosher, Chas. D.....New York.
Newport News Ship Building Co....
..... Newport News, Va.
New York Ship Building Co.....
..... Camden, N. J.
Northwestern Steam Boiler & Mfg.
Co. Duluth, Mich.
Quintard Iron Works Co., New York.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....
..... Superior, Wis.
Thropp, J. E. & Sons Co.....
..... Trenton, N. J.
Toledo Ship Building Co.....Toledo.
Trout, H. G.....Buffalo.

ENGINE ROOM TELEGRAPH CALL BELLS, ETC.
Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co., New York.

ENGINEERING SPECIALTIES AND SUPPLIES.
Lunkenheimer Co. Cincinnati.
Northwestern Steam Boiler & Mfg.
Co. Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.
Hynd, Alexander Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James Cleveland.
Roelker, H. B.....New York.
Wood, W. J.....Chicago.

FANS.
American Blower Co., Detroit, Mich.

FEED WATER PURIFIERS AND HEATERS.

Ross Valve Co.....Troy, N. Y.
Wheeler Condenser & Engineering
Co. New York.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....
..... Schenectady, N. Y.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co....
..... Cleveland.
Fore River Shipbuilding Co.....
..... Quincy, Mass.

FLUE WELDING.
Fix's S. Sons.....Cleveland.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co., Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co., Detroit.
Toledo Fuel Company,Toledo, O.

FURNACES FOR BOILERS.
Continental Iron Works, New York

GAS BUOYS.
Safety Car Heating & Lighting Co..
..... New York.

GAS AND GASOLINE ENGINES.
Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.
Lunkenheimer Co. Cincinnati.

GAUGES, WATER.
Lunkenheimer Co.....Cincinnati, O.

GENERATING SETS.
General Electric Co.....
..... Schenectady, N. Y.

GRAPHITE.
Dixon Crucible Co., Joseph.....
..... Jersey City, N. J.

HAMMERS, STEAM.
Chase Machine Co.....Cleveland.

HEATING AND VENTILATING APPARATUS.

American Blower Co., Detroit, Mich.

HOISTS FOR CARGO, ETC.
American Ship Building Co.....
..... Cleveland.

Brown Hoisting Machinery Co.....
..... Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....
..... Grand Haven, Mich.

General Electric Co.....New York.
Hyde Windlass Co.....Bath, Me.
Marine Iron Co.....Bay City.

HOLLOW STAYBOLT IRON.
Falls Hollow Staybolt Co.....
..... Cuyahoga Falls, O.

HYDRAULIC DREDGES.
Great Lakes Engineering Works...
..... Detroit.

HYDRAULIC TOOLS.
Watson-Stillman Co., The.....
..... New York.

ICE MACHINERY.
Great Lakes Engineering Works...
..... Detroit.
Roelker, H. B.....New York.

INJECTORS.
American Injector Co.....Detroit.
Jenkins Bros.....New York.
Lunkenheimer Co. Cincinnati.
Penberthy Injector Co.....
..... Detroit, Mich.

INSURANCE, MARINE.
Elphicke, C. W. & Co.....Chicago.
Gilchrist & Co., C. P....Cleveland.

Hawgood & Co., W. A., Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F.....
..... New York and Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

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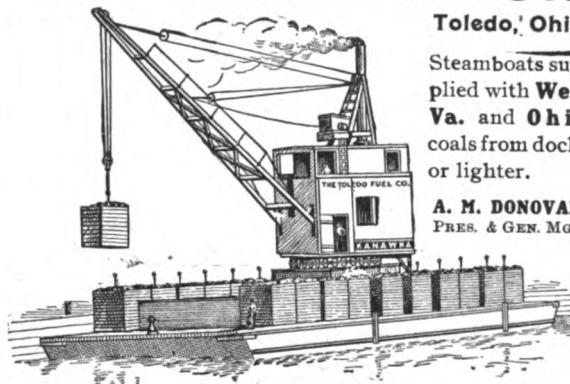
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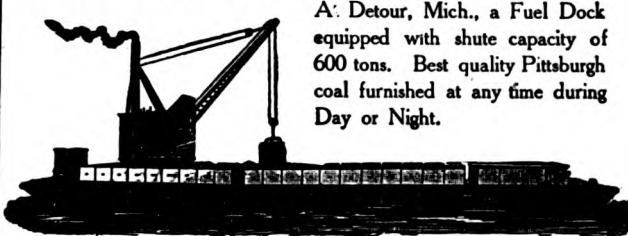


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 Pickands, Mather & Co., Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.
 Truscott Boat Mfg. Co.....St. Joseph, Mich.

LIFE PRESERVERS, LIFE BOATS, BUOYS.
 Armstrong Cork Co.....Pittsburg.
 Carley Life Float Co.....New York, N. Y.
 Drein, Thos. & Son.....Wilmington, Del.
 Kahnweiler's Sons, D.....New York.

LIGHTS, SIDE AND SIGNAL.
 Russell & Watson.....Buffalo.

LOGS.
 Nicholson Ship Log Co., Cleveland.
 Walker & Sons, Thomas.....Birmingham, Eng.

LUBRICATING GRAPHITE.
 Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.
 Lunkenheimer Co. Cincinnati.

LUMBER.
 Martin-Barriss Co. Cleveland.

MACHINISTS.
 Chase Machine Co.....Cleveland.
 Hickler Bros., Sault Ste. Marie, Mich.
 Lockwood Mfg. Co.....East Boston, Mass.

MACHINE TOOLS (WOOD WORKING).
 Atlantic Works, Inc....Philadelphia.

MARINE RAILWAYS.
 Hickler Bros., Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.
 Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.
 Fogg, M. W.....New York

MECHANICAL DRAFT FOR BOILERS.
 American Ship Building Co.....Cleveland.
 Detroit Ship Building Co., Detroit.
 Great Lakes Engineering Works....Detroit.

METALLIC PACKING.
 Katzenstein, L. & Co., New York.
 The National Metallic Packing Co.. Oberlin, O.

MOTORS, GENERATORS— ELECTRIC.
 General Electric Co.....Schenectady, N. Y.

NAUTICAL INSTRUMENTS.
 Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.
 Hynd, AlexanderCleveland
 Kidd, JosephDuluth, Minn.
 Mosher, Chas. D.....New York.
 Nacey, JamesCleveland
 Wood, W. J.....Chicago

OAKUM.
 Stratford, Oakum Co.....Jersey City, N. J.

OILS AND LUBRICANTS.
 Dixon Crucible Co., Joseph.....Jersey City, N. J.

PACKING.
 Jenkins Bros.....New York.
 Katzenstein, L. & Co...New York.
 Robertson, Jos. L. & Sons.....New York.

The National Metallic Packing Co.. Oberlin, O.
 Republic Belting & Supply Co.....Cleveland, O.

PAINTS.
 Baker, Howard H. & Co....Buffalo.
 Upson-Walton Co.....Cleveland.

PATTERN SHOP MACHINERY.
 Atlantic Works, Inc. ..Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
 Dunbar & Sullivan Dredging Co....Buffalo.
 Great Lakes Dredge & Dock Co....Chicago.
 Hickler Bros., Sault Ste. Marie, Mich.
 Hubbell Co., H. W... Saginaw, Mich.
 Parker Bros. Co., Ltd.....Detroit.
 Smith Co., L. P. & J. A...Cleveland.
 Starke Dredge & Dock Co., C. H...Milwaukee.
 Sullivan, M.....Detroit.

PIPE, WROUGHT IRON.
 Bourne-Fuller Co.....Cleveland, O.

PLANING MILL MACHINERY.
 Atlantic Works, Inc....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.

PRESSURE REGULATORS.

Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
 Atlantic Works ..East Boston, Mass.

Buffalo Dry Dock Co.....Buffalo.
 Collingwood Shipbuilding Co.,.....Collingwood, Ont.

Cramp, Wm. & Sons..Philadelphia.
 Detroit Ship Building Co....Detroit.

Fore River Shipbuilding Co.....Quincy, Mass.

Great Lakes Engineering Works....Detroit.

Hyde Windlass Co.....Bath, Me.
 Lockwood Mfg. Co.....East Boston, Mass.

Milwaukee Dry Dock Co.....Milwaukee.

Newport News Ship Building Co.....Newport News, Va.

Roelker, H. B.....New York.

Sheriffs Mfg. Co.....Milwaukee.

Superior Ship Building Co.....Superior, Wis.

Thropp & Sons Co., J. E.....Trenton, N. J.

Toledo Ship Building Co.....Toledo.

Trott, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Great Lakes Engineering Works.. Detroit.

Kingsford Foundry & Machine WorksOswego, N. Y.

Wheeler Condenser & Engineering Co.New York.

REFRIGERATING APPARATUS.
 Great Lakes Engineering Works....Detroit.
 Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.
 Great Lakes Register.....Cleveland.

RIVETS, STEEL FOR SHIPS AND BOILERS.
 Bourne-Fuller Co.....Cleveland, O.

RUBBER SUPPLIES.
 Republic Belting & Supply Co.....Cleveland, O.

SAFETY VALVES.
 Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.
 Baker, Howard H. & Co....Buffalo.
 Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.
 See Wrecking Companies.

SEARCH LIGHTS.
 General Electric Co.....Schenectady, N. Y.

SHEARS.
 See Punches, and Shears.

SHIP AND BOILER PLATES AND SHAPES.
 Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.

SHIP BUILDERS.
 American Ship Building Co.....Cleveland.

Atlantic Works ..East Boston, Mass.

Buffalo Dry Dock Co.....Buffalo.
 Collingwood Shipbuilding Co.,.....Collingwood, Ont.

Cramp, Wm. & Sons..Philadelphia.
 Chicago Ship Building Co..Chicago.

Detroit Ship Building Co....Detroit.

Fore River Ship Building Co.....Quincy, Mass.

Great Lakes Engineering Works....Detroit.

Hyde Windlass Co.....Bath, Me.

Lockwood Mfg. Co.....East Boston, Mass.

Manitowoc Dry Dock Co.....Manitowoc, Wis.

Maryland Steel Co.....Sparrow's Point, Md.

Milwaukee Dry Dock Co.....Milwaukee.

Newport News Ship Building Co...Newport News, Va.

New York Shipbuilding Co.....Camden, N. J.

Roach's Ship Yard....Chester, Pa.

Shipowner's Dry Dock Co..Chicago.

Toledo Ship Building Co.....Toledo.

SHIP CHANDLERS.
 Baker, Howard H. & Co....Buffalo.

Marine Mfg. & Supply Co.....New York.

Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, JosephDuluth.

Steel, Nacey, & Hynd....Cleveland.

Wood, W. J.....Chicago.

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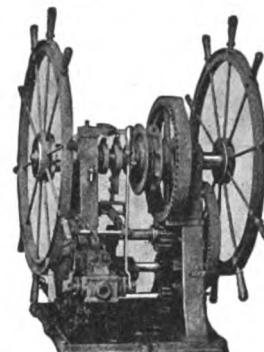


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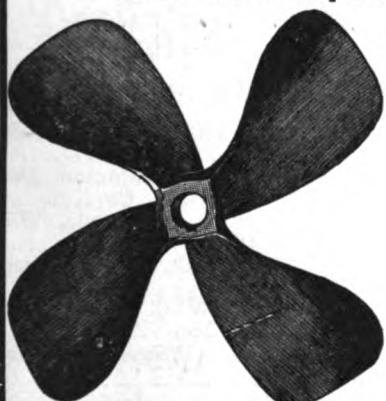
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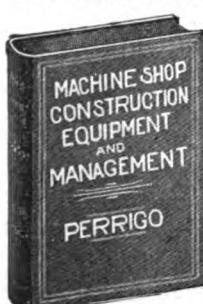
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Martin-Barriss Co.....Cleveland.

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Submarine Signal Co.....Boston

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLT IRON OR STEEL BARS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Holmes, SamuelNew York.

McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS, AND FREIGHT.

American LineNew York.

Anchor LineBuffalo.

Boston SteamshipBoston.

C. & B. Transit Co.....Cleveland.

International Mercantile Marine Co.

.....Philadelphia.

Mallory LineNew York.

New York & Cuba Mail S. S. Co..

.....New York.

Red Star LineNew York.

STEAM SPECIALTIES.

Robertson, Jas. L. & Sons ..New York.

STEEL CASTINGS.

Otis Steel Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....

.....Cleveland.

Chase Machine Co.....Cleveland.

Dake Engine Co.....

.....Grand Haven, Mich.

Detroit Ship Building Co.....Detroit.

Hyde Windlass Co.....Bath, Me.

Marine Mfg. & Supply Co.....

.....New York.

Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.

Schrader's Son, Inc. A....New York.

SURVEYORS, MARINE.

Hynd, AlexanderCleveland.

Parker Bros. Co., Ltd.....Detroit.

Nacey, JamesCleveland.

Steel, AdamCleveland.

Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co....Chicago.

Lunkenheimer Co....Cincinnati, O.

THERMIT

Goldschmidt Thermit Co.,

.....New York City.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....

.....Providence, R. I.

Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co..

.....Kingston, Ont.

Great Lakes Towing Co..Cleveland.

TRUCKS.

Boston & Lockport Block Co.....

.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co..Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

Jenkins Bros.New York

Lunkenheimer Co.....Cincinnati.

Ross Valve Co.....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ashton Valve Co.,.....Boston.

Lunkenheimer Co.....Cincinnati.

Republic Belting & Supply Co.....

.....Cleveland, O.

Ross Valve Co.....Troy, N. Y.

Scoville Check Valve Co.....

.....Ashtabula, O.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.

Douglas, G. L. Jr.....Duluth

Elphicke, C. W. & Co.....Chicago.

Hall, John B.....Buffalo.

Helm & Co., D. T.....Duluth.

Hawgood & Co., W. A....Cleveland.

Holmes, SamuelNew York.

Hutchinson & Co.....Cleveland.

McCarthy, T. R.....Montreal.

VESSELS AND FREIGHT AGENTS—Con.

Mitchell & Co.....Cleveland.

Parker Bros. Co., Ltd.....Detroit.

Prindiville & Co.....Chicago.

Richardson, W. C.....Cleveland.

Sullivan, D. & Co.....Chicago

WATER GAUGES.

Lunkenheimer Co.....Cincinnati, O.

WHISTLES, STEAM.

Lunkenheimer Co.....Cincinnati.

WILFORD'S WATERPROOF CLOTH.

Bunker, E. A.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.

Upson-Walton Co.....Cleveland.

WINDLASSES.

American Ship Windlass Co.....

.....Providence, R. I.

American Ship Building Co.....

.....Cleveland.

Dake Engine Co.....

.....Grand Haven, Mich.

Hyde Windlass Co.....Bath, Me.

Marine Mfg. & Supply Co.....

.....New York.

WINCHES.

American Ship Windlass Co.....

.....Providence, R. I.

Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..

.....Kingston, Ont.

Great Lakes Towing Co..Cleveland.

Parker Bros. Co., Ltd.....Detroit.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....

.....Wilmington, Del.

Manitowoc Dry Dock Co.....

.....Manitowoc, Wis.

Truscott Boat Mfg. Co.....

.....St. Joseph, Mich.

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Drein, Thos. & Son.....

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McLaughlin Iron Works.

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Rennick, Tom J.
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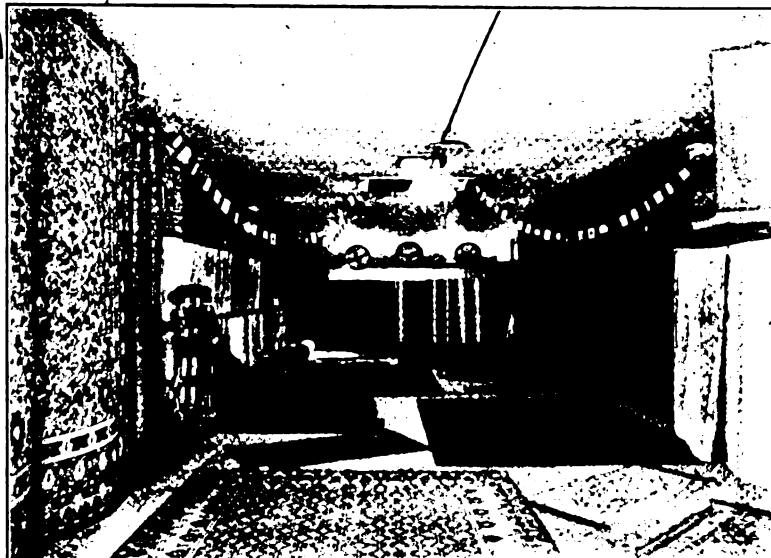
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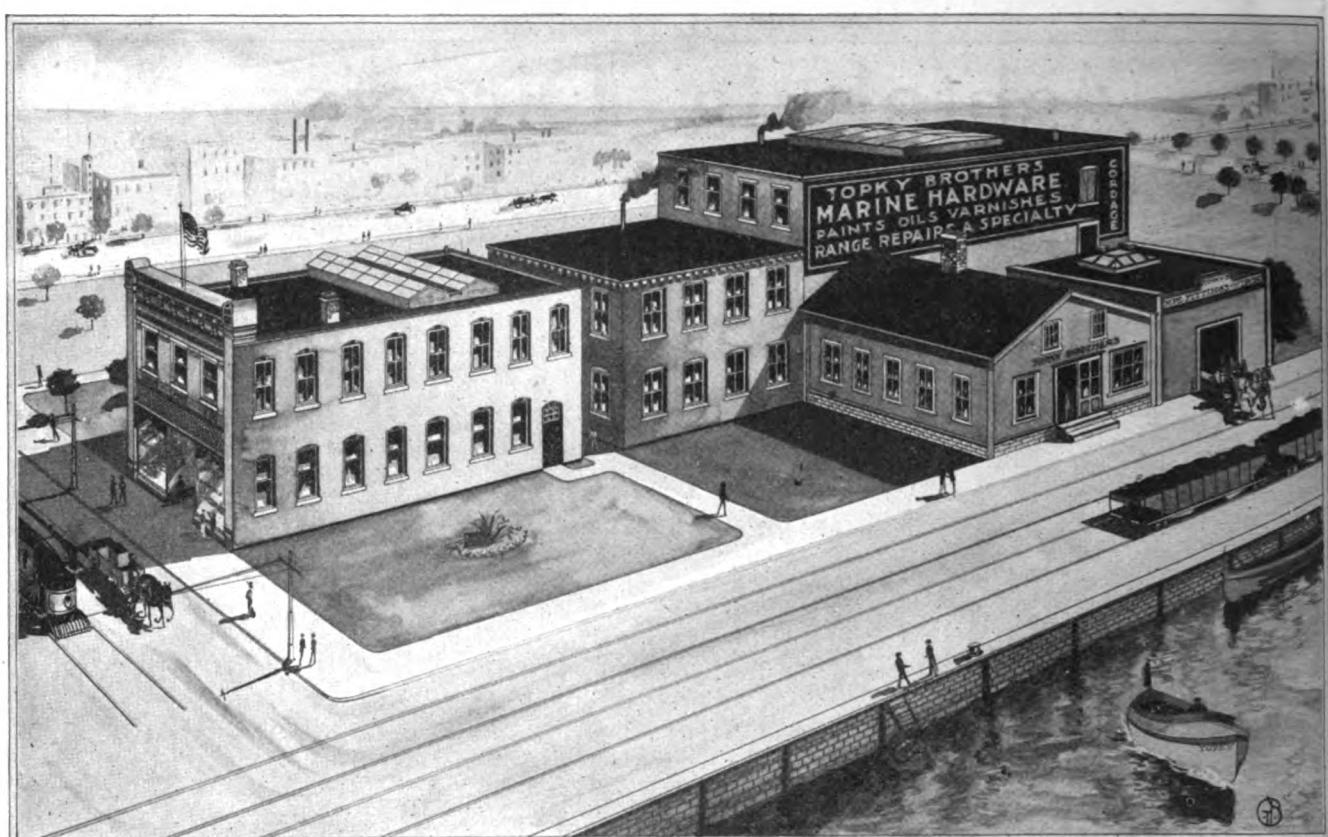
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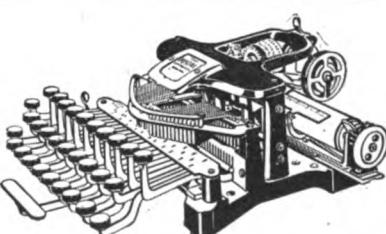
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Chicago Ship Building Co.	4	Jenkins, Russell & Eichelberger	54	Rennick, Tom J.	53	Ward Line	56
Cleveland & Buffalo Transit Co.	56	Kahnweiler's Sons, David	59	Republic Belting & Supply Co.	47	Watrous, J. W.	53
Cleveland City Forge & Iron Co.	59	Katzenstein, L., & Co.	59	Richardson, W. C.	—	*Watson-Stillman Co.	59
Collingwood Shipbuilding Co.	12	Kidd, Joseph	55	*Ritchie & Sons, E. S.	13	Wheeler Condenser & Engineering Co.	—
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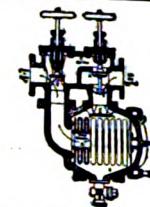
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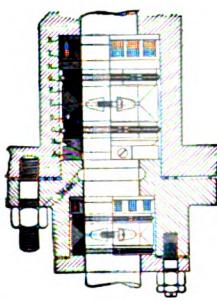


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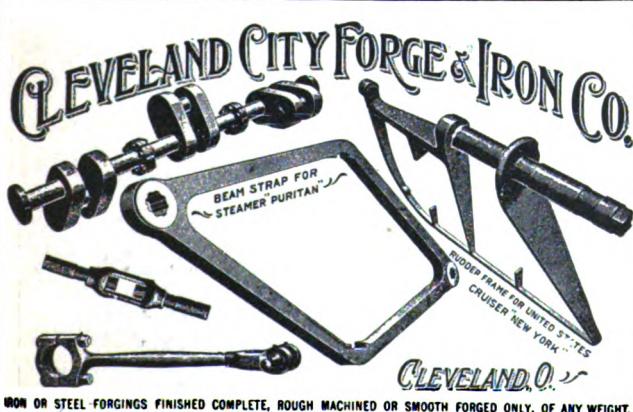
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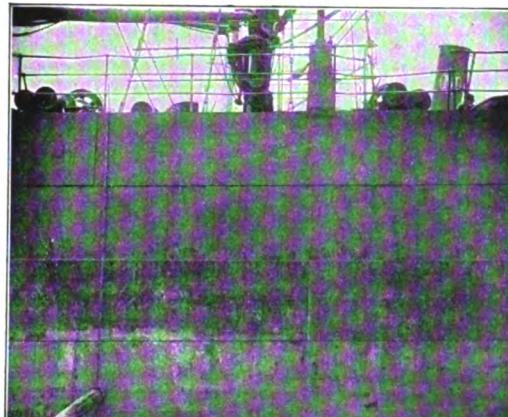
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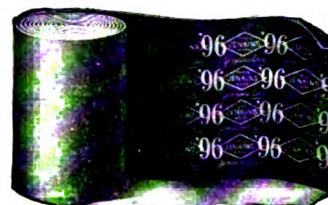
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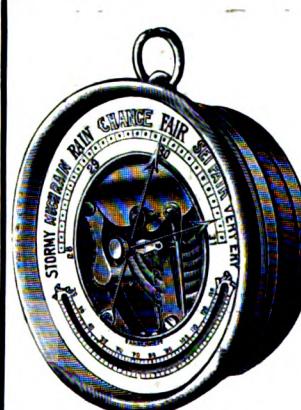
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